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A STUDY OF THE ETIOLOGY OF INFLAMMATORY DISEASES OF THE NOSE AND ACCESSORY SINUSES.*

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Introductory Remarks.—I have long been of the opinion that the causes of the inflammatory diseases of the nose and accessory sinuses have not been systematically presented in any work on rhinology. Believing myself incapable of elucidating the subject in a logical and convincing manner I have, heretofore, refrained from formulating my ideas in writing. In my lectures at the College of Physicians and Surgeons, I have more than once given utterance to them, and have finally concluded to place them in writing with a view of inviting my confreres to criticise, or to refute them if they do not appeal to their judgement or coincide with their experience.

My views are based upon clinical observations and upon well known laws relating to inflammatory processes. I am emboldened, therefore, to present them to this body of distinguished rhinologists for their approval or disapproval.

INFLAMMATION.

Before discussing the causes of inflammation, it will be well to define what inflammation is.

Acute inflammation.—Acute inflammation is a three-fold reaction excited by the presence of certain noxa, or irritant material, in the tissues. The noxa or irritant is usually a pathogenic micro-organism and its toxin, or it may be of chemical or traumatic origin. When

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of chemical or traumatic origin the irritant primarily consists of the dead or broken down cells of the tissues.

Dead or broken down cells when present in the tissues in excess become foreign bodies, and as such, a reaction of the living cells is excited for the purpose of eliminating them from the body. Furthermore, the dead cells in the process of disintegration give off a ferment or chemical substance which also excites a reaction, the purpose of which is to free the tissues of its presence. The reaction thus far excited is directly traceable to the presence of dead and disintegrating tissue cells. Ordinarily, after a short time, a secondary irritant gains entrance to the injured tissues and becomes the more important factor in the reactionary process. That is, pathogenic bacteria infect the impaired tissues so that in nearly every acute inflammatory process, whether it is due to primary infection or to chemical or mechanical trauma, pathogenic micro-organisms must be regarded as the paramount exciting or noxious agent causing the reaction of inflammation.

The reaction of inflammation is, therefore, an increased physiological activity of the living tissues of the body for the purpose of disposing of a noxious or irritant substance or organisms that have invaded them in excess of the normal quantities.

The reaction of acute inflammation is a three-fold process, namely:

1. Increased hyperaemia.
2. Increased nutrition (increased resistance).
3. Increased leukocytosis.

1. Increased hyperaemia is a constant and important reaction as through it the cells are provided with the extra nutrition they need under conditions of stress. The increased blood supply also stimulates and facilitates the increased migration of leukocytes, and it flushes the poisoned area and dilutes the noxious substance and thus reduces the intensity of the irritation. The hyperaemia is nearly always passive in type. It has been demonstrated that passive hyperaemia is more potent in overcoming bacterial irritation than active hyperaemia, though active hyperaemia when well established is also very efficient.

2. Increased nutrition of the tissues is prompted by the hyperaemia for obvious reasons. They are under stress because of the presence of noxious substance, and need extra nutritional facilities. Their vital force, or resistance, is not equal to the emergency placed upon them and upon their resistance depends the issue of the warfare. Their means of defense may be characterized as two-fold,

namely, (a) their ability to envelope and digest micro-organisms, and (b) their ability to produce and emit a biochemical substance or ferment, the purpose of which is to weaken or destroy their foe. This all requires increased nutrition (blood) which begets increased powers of resistance.

If the nutrition is not adequate for these purposes the micro-organisms and their toxin or biochemical irritant, may cause destructive, and what we are accustomed to call pathogenic changes in the tissues.

3. Increased leukocytosis is also an important reaction of inflammation. While the function and modes of activity of the leukocytes is not fully understood it has been fairly well demonstrated that the polymorpho-nuclear leukocytes envelope and destroy bacteria, while the lymphocytes envelop and destroy broken down cells. Other cells as the fibroblasts also participate in these functions under certain conditions. I have not the time to enter into a discussion of all the processes included in the reaction of inflammation and only desire to briefly suggest the more important and well known processes in order to prepare our minds for a clearer understanding of the etiology of the inflammatory diseases of the nose and accessory sinuses.

Parenthetically I wish to add one additional statement concerning the adequacy of the reaction of inflammation. According to Adami the reaction of inflammation may be of three types:

1. Adequate reaction.
2. Inadequate reaction.
3. Excessive reaction.

The reaction is usually inadequate. That is, the increased hyperaemia, cell nutrition and migration of leukocytes is insufficient to dispose of the pathogenic micro-organisms before they have caused considerable damage to the tissues. It follows, therefore, that in the treatment of inflammatory diseases the reaction of inflammation should be promoted rather than diminished. By so aiding the defensive and offensive activities of the tissues, the bacteria, their toxins, and the broken down tissue cells may be speedily removed, and a cure effected.

Inflammation Affecting Mucous Surfaces.—Adami says: "The main distinguishing feature of the mucous surface is the presence there of a layer of mucous cells, cells of a glandular type, capable when stimulated of forming and discharging relatively large amounts of mucin. The hyperaemia, the exudation of serum, the migration

of leukocytes, all these occur in the submucous layer just as in the subserous layers. The changes in the reaction are due solely to the interposition of this layer of mucous cells. There is, in the first place, a more definite basement substance interposing a certain amount of resistance to surface exudation. The layer of mucous cells is more complicated, and although the fully developed cells may be discharged, they are apt to remain relatively undifferentiated 'mother cells' at the base; or otherwise the same intensity of irritation does not lead to as extensive a denudation. And, thirdly, by the combined action, it may be, of the irritant and of the hyperaemia, the fully formed mucous cells are stimulated to produce increased amounts of mucin, so that an inflammation of moderate grade is characterized by an abundant amount of mucinous discharge rather than of fibrinous deposit."

"We speak of such a moderate case, with exudation of serum containing abundant mucin, cast-off mucous cells, and relatively few leukocytes, as a 'catarrhal inflammation,' if there be sufficient leukocytes extruded, the character is altered to that of a 'mucopurulent inflammation;' if more severe, with complete destruction of the mucous membrane proper, then, as in serous surfaces, there is the same tendency for the leukocytic exudation to favor a deposit of fibrin upon the surface, and then we obtain a 'membranous inflammation.'"

"Despite the fact familiar to all that diphtheria is a disease set up by a specific bacillus, and the equally well-known fact that a like membranous inflammation may be induced by several forms of microbes, we still commonly speak of such a membrane as being diphtheritic. It would be better to confine this term purely to cases in which we know that the bacillus diphtheria is the causative factor; failing this, we may accept the term diphtheritic as covering all such membranous inflammation, and employ the term diphtherial for such cases as are of pure diphtherial origin.

"Further, if there be yet more severe destruction of the surface cells, this may go on to ulceration. Where we have pyogenic organisms present, there is a dissolution and breaking down of any fibrin that is formed and consequent absence of a membrane. In such cases there is a distinct tendency for the process to extend in the submucosa beneath the still intact mucous membrane, the part becoming infiltrated with pus. This form is spoken of as 'phlegmonous inflammation.'"

Chronic Inflammation.—The reaction of chronic inflammation consists of the following phenomena:

a. Slightly increased hyperaemia.
b. Slightly increased cell nutrition.
c. Slightly increased migration of leukocytes.

It is needless to add that the reaction is inadequate to remove the noxa or irritant which according to pathologists is usually bacteria of low virulence. There is usually a local obstructive lesion of the nose in chronic inflammation.

A product of chronic inflammation that is always present is the proliferation of fixed cells, usually of the least differentiated type, namely, connective tissue cells.

THE ETIOLOGY OF INFLAMMATORY DISEASES OF THE NOSE AND ACCESSORY SINUSES.

Having thus briefly defined inflammation we are prepared to discuss its causes.

The causes of inflammatory diseases of the nose and accessory sinuses are divided into two groupes, namely:

1. Exciting causes.
2. Predisposing causes.

1. *Exciting Causes.*—The exciting causes are bacteria, and chemical and traumatic destruction of tissue cells. This phase of the subject has already been discussed under Inflammation and will not be dwelt upon in this connection further than to say, that, pathogenic bacteria can not irritate the tissues of the body so long as the resistance of the cells is normal, that is, so long as they are healthy. There may be an exception to this rule when the germs are exceptionally virulent, though this is rare. Virulent pathogenic bacteria are constantly present in the upper respiratory tract, though they are harmless until the resistance of the cells is lowered by some intracorporial or extraneous influence.

2. *Predisposing Causes.*—There are many predisposing causes of inflammatory diseases of the nose, some of which are best explained by grouping them around a well recognized physiopathologic law, namely, *When the drainage and aeration of a mucous membrane lined cavity is impaired or blocked, the conditions are favorable for the growth of pathogenic bacteria.*

If this is true, each case of inflammatory disease of the nose and accessory sinuses should be examined to ascertain if the drainage and aeration of these spaces are impaired or blocked. If they are, the obvious therapeutic duty is to remove the obstruction by such remedial measures as will best accomplish the purpose. These measures may be either medicinal, hygienic or surgical.

If, on the contrary, no obstructive lesion is found, other causes for the lowered resistance of the tissue should be sought for. If the inflammation is a primary acute one, and the lowered resistance is due to shock from exposure, it may be useless to attempt to remove the cause as it was transient. The immediate duty in such a case is to promote the reaction of inflammation and thus check the inflammatory process. As Adami so aptly says, the way to cure inflammation is to increase it.

In order to logically approach the consideration of the causes of the lowered resistance of the mucous membrane of the nose and accessory sinuses they should be divided into two groupes, namely:

a. Extranasal b. Intranasal.

EXTRANASAL PREDISPOSING CAUSES.

Age seems to exert some influence upon the resistance of the nasal mucous membrane. Young children and young adults are more frequently subject to inflammatory diseases of the nose and accessory sinuses than those of more advanced years. This is, no doubt, due in part to indiscretion, as the improper care and protection of the body from the inclemencies of the weather. Persons of more mature years have more mature minds and better judgement, and they do not expose themselves needlessly, as in youth and childhood. Then, too, the tissues acquire a resistance, or immunity to the noxious irritations.

Sex, perhaps, exerts some influence on the occurrence of inflammatory processes. Males are more exposed and more reckless than females, hence they are more often affected by inflammatory diseases. They are more pugilistic and more often have broken noses and consequent nasal obstruction than females.

Climate undoubtedly influences the occurrence of inflammatory processes. In regions where there is much cold wet weather with sudden changes of temperature, and of hygroscopic conditions of the atmosphere, it is more difficult to protect the body, particularly the feet, from the shock incident to such exposures. The shock thus sustained by the vasomotor nervous system leads to a lowered resistance of the mucous membranes, especially of the nose and accessory sinuses, hence the growth of bacteria in these regions is favored.

Exposure, especially unusual or unequal exposure of the body to damp cold or other atmospheric and metallurgic conditions, weakens the resistance of the tissues. The exposure of the feet to damp and cold is a most fruitful source of rhinitis and inflammations elsewhere in the body. Draughts striking a single portion of the body are det-

rimental to the resistance of the tissues much more than when the whole body is thus exposed. Within certain limitations the exposure of the whole body often has a tonic effect, as all the animal mechanisms of the body are equally and simultaneously stimulated. When partial exposure is experienced only a portion of the mechanism is stimulated and an imbalance of the functional activities results. That is, there is confusion and havoc in the cellular activities, the nasal expression of which is often some form of inflammation.

The *clothing* is an important factor in maintaining or lowering the resistance of the mucous membrane of the upper respiratory tract. Too much is as productive of evil as too little clothing. If too much is worn the skin is rendered sensitive to slight exposure, and if too little is worn the body is subjected to continual stress, and exhaustion of the vital forces results. Either condition prepares the soil for the growth of pathogenic bacteria in the respiratory passages. Perhaps the most vulnerable part of the body is the feet, through the soles of which course large blood vessels. Anyway cold wet feet is a common cause of acute rhinitis and sinuitis.

The proper selection of *underwear* is a much mooted question. Wool is advocated by some, while linen or linen mesh is strenuously recommended by others. In the meantime most persons buy cotton for summer and cotton and wool mixtures for winter wear; not because they believe they are the best, but because they are cheaper.

My ideas on the subject are as follows: Linen absorbs moisture better than either cotton or wool, and is, therefore, better for summer wear. Wool is warmer than either cotton or cotton and wool mixtures and is better for winter wear. Some persons perspire easily in winter and for them linen should be worn next to the skin. If this does not retain enough body heat light wool should be worn over the linen underwear. Cotton or cotton and wool mixtures are perhaps never preferable to wool and to linen and wool combinations for the winter months.

The outer garments should be medium weight for the winter months, the over garments being depended upon for extra protection for outdoor wear. If the indoor clothing is too heavy the skin becomes tender and subjects the wearer to shock upon undue exposure when out of doors. The underclothing and outer garments should, therefore, be selected for their absorptive and heat-retaining properties. Hard and fast rules cannot be laid down in reference to the clothing, each subject being a law unto himself. The aim should be to so regulate the clothing as to avoid either extreme, as to do otherwise subjects the system to shock, and thus

lowers the cellular resistance and prepares the soil for the growth of micro-organisms and inflammation.

The *digestive tract* is by some writers justly held responsible for inflammatory processes of the upper respiratory tract. If the processes of digestion and nutrition are imperfectly performed, noxious material enters the vascular and lymphatic circulation and thus places extra stress upon all the fixed and migrating cells of the body. Lowered resistance therefore naturally follows.

Certain *constitutional diseases* likewise produced a lowered resistance of the tissues, including the mucous membrane of the nose and accessory sinuses. Diabetes, syphilis and all diseases due to faulty metabolism especially affect the tissues of the respiratory tract and predisposes them to infection and inflammation.

Heredity probably has no direct influence in the predisposition to infectious and inflammatory diseases of the nose. Indirectly it may have such an influence. That is, certain anatomical conformations of the nasal chambers may be transmitted from parents to the child and thus lead to a predisposition to infection and inflammation.

Adenoids may interfere with the drainage and aeration of the nose and accessory sinuses, or inflammation focalized in them may lower the resistance of the mucous membrane of the nasal and accessory sinuses and thus predispose to infection and inflammation. These and other extranasal influences may prepare the soil for the growth of pathogenic bacteria in the nose and accessory sinuses and may eventuate in empyaema of the sinuses without obstructive lesions in the nose. Whatever the case of the lowered resistance of the mucous membrane the result is the same.

I do not wish to be understood as saying that infection and inflammation always follow a lowered resistance of the nasal mucous membrane. I only claim that a lowered resistance predisposes to such a process. The virulence of the micro-organisms present and perhaps other conditions enter into the equation.

INTRANASAL PREDISPOSING CAUSES.

In this connection I wish to repeat the physio-pathological law which largely explains the occurrence of infection and inflammation of the nose and accessory nasal sinuses, namely,

Cavities lined with mucous membrane are predisposed to inflammation when their drainage and aeration are obstructed.

From experience we know that when such obstructions are present and are removed either by local application or by surgical interference, relief often promptly follows.

Let us direct our attention, therefore, to some of the obstructive lesions of the nose which predispose the mucous membrane to infection and inflammation.

Obstruction of the Lower Portion of the Nose.—I desire first to call attention to a fact that has long impressed me as very important, namely, that obstructions in the lower portion of the nasal cavity have a different clinical significance from obstructions located higher in the nasal passages. I also wish to call attention to the clinical significance of anterior obstructions as contrasted with obstructions otherwise located.

Obstruction of the Inferior Portion of the Nose.—Obstruction of the inferior portion of the nasal passages causes an approximation or an impingement of the inferior turbinal against the septum, at least at certain points. The pressure may be either intermittent or constant. The question of greatest importance is, How does such an obstruction affect the drainage and aeration of the nose and sinuses? As most of the mucous membrane of the nose and sinuses is located above the inferior turbinal, it is obvious that aeration is but little affected by such an obstruction. The pathway of the inspiratory current is largely limited to the middle and superior meatuses of the nose, and, inasmuch as an obstruction located inferiorly does not materially occlude the inspiratory tract, there is comparatively little disturbance of function. Furthermore, the drainage of the secretions is not materially blocked. The usual obstructive lesion in this region is a spur or ridge on the septum. The ridge is rarely equally prominent along its entire length. On the contrary it presents one or two prominent spines or knuckles which approximate or impinge against the inferior turbinated body, thus leaving wide gaps through which the secretions may drain to the floor of the nose without marked impediment.

The practical deduction to be drawn from these facts is, that an obstruction in the lower portion of the nose does not markedly reduce the resistance of the mucous membrane, especially in the upper portion of the nasal chambers and in the accessory sinuses. It does, however, have some influence in this direction, and in a degree predisposes to infection and inflammation. The crests of the spines or knuckles may accumulate secretions, which become dessicated in the form of moist or dry crusts. The tissue cells beneath the crusts are injured, and their resistance lowered, and to this extent there is a predisposition to infection and inflammation. Furthermore, the impingement of the spur or spine against the outer wall of the nose causes traumatic injury and

results in some degree of lowered resistance which may lead to bacterial infection and inflammation. The irritation is not usually pronounced and only causes an increased hyperaemia and nutrition of the tissues.

Obstructive lesions in the lower portion of the nose, therefore, may cause a turgescence of the mucous membrane, which is richly supplied with erectile tissue (the swell bodies), which, after a more or less prolonged period, may result in hypertrophy. In the early or turgescent stage the condition is called turgescent rhinitis; in the latter stage, it is called hypertrophic rhinitis. If, however, repeater infection occurs, the irritation is of a different type and causes hyperplastic changes.

Unfortunately, however, a deviation of the lower portion of the septum is usually accompanied by a deviation of the upper portion of nose in the region of the middle turbinal. When this is the case the type of inflammation is radically different from that present in an uncomplicated lower deviation. That is, a deviation in the region of the middle turbinal often obstructs the drainage and aeration of the superior meatus, and of all, or nearly all, of the nasal accessory sinuses. The secretions are retained, undergo decomposition, liberate a ferment and irritate the mucous membrane. In brief, the inflammation is attended by the proliferation of the least differentiated of the fixed cells or connective tissue cells. In other words, hyperplasia of the mucous membrane occurs. This is known as hyperplastic rhinitis. The irritation from the middle turbinal region may extend by continuity of tissue to the inferior turbinal and cause hyperplasia of this structure as well. Hence, hyperplastic rhinitis often involves both turbinated bodies. In simple deviations, however, limited to the lower portion of the nasal chambers, the inflammation is usually of the hypertrophic type.

Obstruction of the Anterior Portion of the Nose.—Deviation of the anterior portion of the septum from traumatism is a common cause of obstruction of the anterior portion of the nasal chamber. The relationship it bears to inflammatory processes of the nose and accessory sinuses is interesting and instructive. An anterior deviation does not interfere with the drainage of the secretions except in so far as it may affect the mechanical force of the respiratory currents of air. The mechanical force of the inspired air is especially manifested in the region of the infundibulum and posterior ethmoidal cells where the inspiratory current sweeps over the hiatus semilunaris and the ostea of the posterior ethmoidal calls and causes

slight rarefaction of the air within the sinuses drained by these openings. The mechanical impact facilitates the flow of secretions from the ostea and hiatus semilunaris and thus prevents dessication and blockage of these openings. To this extent obstructive anterior deviations of the septum interfere with drainage.

The aeration upon the obstructed side is, however, very materially affected. The slight interference with the flow of the secretions caused by the absence of the mechanical impact of air results in a moderate retention of secretions. Decomposition of the secretions may therefore take place and cause a lowered resistance of the mucous membrane and thus establish a predisposition to infection and inflammation.

When the ridge or spur in the lower portion of the nose extends well forward into the vestibule, it also interferes with the aeration drainage is described in the preceding paragraph.

When either type of anterior obstructive deviation is present, another and more important etiological factor must be taken into consideration, namely, the rarefaction of air posterior to the obstruction. Air being unable to enter the nostrils rapidly enough during the descent of the diaphragm is rarefied, or a state of negative air pressure is established. This, according to Bier's theory, should prevent serious inflammatory processes, as the negative air pressure thus produced promotes the reaction of inflammation and thus prevents serious inflammatory disease. Doubtless the negative pressure thus automatically produced does exert a favorable influence upon the inflammatory process excited by the lack of aeration and the slight retention of the secretions. Thus, strange as it may seem, the anterior obstructive lesion predisposes to infection and inflammation and at the same time tends to cure it.

Clinically, I have often noted the comparatively slight inflammatory disease of the nasal mucous membrane present in simple anterior deviations.

The chief departure from the normal is a turgescence or a hypertrophy of the inferior turbinal. Little pathologic change is present in the middle turbinal region unless there is an associated obstruction in that location. The negative air pressure easily accounts for the turgescence of the erectile tissue of the inferior turbinals. After a prolonged duration of the turgescence, whether intermittent, alternating or constant, hypertrophy occurs as a result of the increased nutrition.

Obstruction of the Middle Turbinal Region.—Obstruction in this portion of the nasal chambers is productive of more serious

inflammatory disease of the nose and accessory sinuses than obstruction in any other portion of the nose. This is apparent when we recall the fact that the ostea of the posterior ethmoidal and sphenoidal sinuses open into the superior meatus above the middle turbinal, while the frontal, anterior ethmoidal and maxillary sinuses drain into the middle meatus beneath the middle turbinal.

If the septum is deviated so as to press against, or approximate near to, the middle turbinal, the olfactory fissure is blocked and the drainage of the posterior ethmoidal and possibly of the sphenoidal cells is interfered with.

Clinically I have noted the presence of two types of deviations of the septum that close, or nearly close, the olfactory fissure. One is a bowing of the perpendicular plate of the ethmoid bone and triangular cartilage, and the other is a thickening of the septum in the region of the middle turbinated body. The bowed septum is thin and easily corrected by the submucous resection of the septum, whereas the thickened septum often involves only the mucous membrane and is more difficult to correct.

In some subjects there are large pneumatic spaces in the middle turbinal which may either close a part or all of the olfactory fissure, or they may encroach upon the hiatus semilunaris beneath it. In the first instance the drainage and aeration of the superior meatus of the nose, and in the second instance the drainage and areation of the frontal, anterior ethmoidal and maxillary sinuses is impaired.

A large bulla ethmoidalis projecting medianward and downward may obstruct the hiatus semilunaris, and thus obstruct the drainage and aeration of the cells draining into the infundibulum, namely, the frontal, anterior ethmoidal and maxillary sinuses.

Likewise the occasional pressure of cells in the inner wall of the infundibulum or uncinate process of the ethmoidal bone may block the infundibulum and cause serious inflammatory disease of the frontal and anterior ethmoidal cells and the maxillary antrum.

In about 50 per cent. of cases the fronto-nasal canal does not communicate with the infundibulum, but opens directly into the middle meatus more anteriorly. In these subjects an enlarged projecting bulla ethmoidalis and cells in the uncinate process would not block the drainage and aeration of the cells draining through the fronto-nasal canal, namely, the frontal and anterior ethmoidal cells. The ostium of the antrum, however, may be obstructed, as it usually opens into the infundibulum.

THE RESULTS OF HIGH OBSTRUCTIONS.

In the Nose.—When the olfactory fissure is obstructed by either septal or turbinal deformity, the drainage of the secretions and the aeration of the posterior ethmoidal and sphenoidal sinuses is impaired. The secretions are retained and undergo retrograde changes. The mucous membrane is bathed in the secretions and becomes impaired and its functional activity and its resistance is lowered. The biochemical substances liberated in the process of decomposition constantly irritate the mucous membrane, especially of the middle turbinated body. Acute infection occasionally occurs. During the intervals between the acute inflammatory processes a mild staphylococcal or other infectious inflammation persists. Under these conditions there is a proliferation of fixed cells in the tissues, usually the least differenitated of the fixed cells, viz.: connective tissue cells.

The results of these influences in the nose is known as Hyperplastic Rhinitis, which chiefly involves the midle turbinated body, though it often extends to the inferior turbinal as well.

In the Posterior Ethmoidal and Sphenoidal Cells.—The partial or complete closure of the olfactory fissure, and the consequent retention of the secretions of the superior meatus, and the ethmoidal and sphenoidal sinuses draining into it, cause hyperplastic changes in the mucous membrane, not alone of the middle turbinal, but of the superior meatus and of the accessory sinuses opening into it. The conditions thus produced are favorable for infection and inflammation. The inflammatory process may be either catarrhal, purulent, fibrinous, phlegmonous or suppurative in type, and in each instance it is in part due to pathogenic micro-organisms.

The sinuitis thus excited may continue for years without engaging the attention of either the patient or physician. Headache and slight dizziness, aggravated upon stooping, may be the only symptoms complained of, except, possibly, recurrent attacks of acute coryza. Or the sinuitis may be distinctly and frankly purulent with copious discharge into the epipharynx, and possibly to some extent through the olfactory fissure.

Atrophic rhinitis with ozena is, in my opinion, in adults, often a suppurative sinuitis with atrophy of the mucous membrane. Space does not permit of a full discussion of this phase of the subject. Personally I have repeatedly overcome the ozenic secretion by treating the case as though it were a suppurative sinuitis. I have made skiagraphs of several cases of atrophic rhinitis with ozena, and without exception they have shown the existence of sinus

disease. This does not, of course, determine which was primary, the atrophic rhinitis or the sinuitis. My opinion is largely based upon the results following the treatment for the sinuitis.

Obstruction Due to the Bulla Ethmoidalis, Cells in the Middle Turbinal and Uncinate Process.—As previously stated, a large bulla ethmoidalis may occlude the infundibulum and thus block the drainage and aeration of the maxillary, frontal and anterior ethmoidal cells. This, as heretofore explained, causes the retention of the secretions and lowered resistance of the tissue, thus establishing a predisposition to infection and inflammation.

Cells in the middle turbinated body and uncinate process likewise may block the infundibulum and cause similar results. The exceptions have been referred to wherein the fronto-nasal canal opens directly into the middle meatus anterior to the infundibulum.

It appears, therefore, that there are several factors entering into the causation of inflammatory diseases of the nose and accessory sinuses. The exciting cause is nearly always pathogenic microorganisms, while the predisposing causes are numerous extranasal influences which are often combined with obstructive lesions in the nose. The latter should always be studied with reference to whether they interfere with the drainage and aeration of the nose and accessory sinuses. If only extranasal causes of lowered resistance are found, the treatment should be addressed to their removal; and if, in addition to the extranasal influences, obstructive lesions are found, they should be corrected by probing or by surgical interference.

CONCLUSIONS.

1. Acute inflammation is usually a threefold reaction excited by pathogenic bacteria and their toxins, namely:

   (a) Increased passive hyperemia.
   (b) Increased nutrition of the tissues.
   (c) Increased migration of leukocytes.

The reaction of acute inflammation is the respone of Nature's forces for the purpose of destroying the bacteria and their toxins.

2. The reaction of inflammation is usually inadequate to quickly remove the infective bacteria and their toxins, hence the inflammation is continued for several days, or it may be indefiniately prolonged.

3. Chronic inflammation consists of the same reactions in much less degree, and is still further characterized by the proliferation of fixed cells into the tissues, notably connective tissue cells.

4. The exciting cause of inflammation is generally some pathogenic micro-organism.

5. Pathogenic bacteria do not *per se* cause inflammation. There must be a lowered resistance of the tissues before they will rapidly multiply and produce inflammation.

6. Anything that lowers the vitality or resistance of the mucous membrane of the nose and accessory sinuses predisposes it to infection and inflammation.

7. The extranasal influences that lower the vitality of the mucous membrane are: Sex, climate, exposure, improper clothing, digestive disorders, constitutional diseases and dycrasia, hereditary anatomical peculiarities of the framework of the nose, adenoids, etc., etc.

8. The intranasal predisposing causes of inflammation of the mucous membrane of the nose and accessory sinuses are, perhaps, best explained by the well-recognized law that *Obstruction of the drainage and aeration of mucous-lined cavities predisposes them to infection and inflammation.*

The character of the inflammation and the end result is partially determined by the location of the obstruction in reference to the various tissues of the nose and to the accessory sinuses.

9. Anterior and inferior obstructions more often cause turgescent and hypertrophic rhinitis, as they do not materially interfere with the drainage of the secretions and therefore cause very little or no irritation.

10. Obstruction higher in the nose, in the region of the middle turbinal and the infundibulum causes the retention of the secretions and interferes with the aeration of the superior meatus and the accessory sinuses, thus lowering the resistance of the tissues, and establishing a marked predisposition to infection and inflammation of the nasal and accessory sinuses. The inflammation may be catarrhal or suppurative and acute or chronic in type.

11. The long-continued mild irritation excited by obstructive lesions in the middle turbinal region often results in hyperplastic rhinitis, which may be limited to the middle turbinal, though it may extend to the inferior turbinal.

12. Inflammation also extends to adjacent parts by the continuity of tissue, hence it may extend from one part of the nasal mucous membrane to another, or it may extend from the nasal mucous membrane to the sinuses.

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PATHOLOGIC CONDITIONS OF THE NASO-PHARYNX IN THE ADULT.*

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Ever since the publication of the memorable paper by Hans Wilhelm Meyer, in which he announced the pathologic importance of adenoid growths in the naso-pharynx, attention has been directed to this field, and during succeeding years there has been manifested a progressive appreciation of the value of the discovery and of the importance of removing these obstructive growths which, if allowed to remain, are so likely to induce the development of either otitic or systemic disturbance which may so seriously impair the vitality of the patient or so unfavorably influence his future welfare in so many ways.

The posterior rhinoscopic examination is often quite unsatisfactory, even in a patient with a tolerant throat, owing to the smallness of the opening leading to the naso-pharynx when the soft palate is fully relaxed. The uvula is also at times broad or enlarged so that a view must be taken from either side thereof. In such cases a very small rhinoscopic mirror, even a No. 00, may be required, though of course the smaller the mirror used the less light is reflected, and the smaller the field exposed, hence a complete view is obtained only by successively examining the several points of interest. By using as large a mirror as the patient will tolerate, the illumination is proportionately intensified.

The angle at which the mirror is bent upon the handle is also a point to be considered and the more abrupt it is, up to nearly a right angle, the better the view obtained of the lower portions of the choanae, while in order to see the vault to the best advantage an angle more extended serves to a much better purpose. In order to fill the varying requirements, a tilting mirror, the angle of which can be regulated by a spring thumb lever, is almost a necessity. I use one of the Michels pattern. The patient should be directed to close the eyes and breathe steadily through the nose while the tongue is pressed firmly downward with a tongue depressor. Sometimes this can better be done by the patient in order to avoid gagging.

* Read before the Eleventh Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, St. Clair, Mich., August 30, 31 and September 1, 1906.

For several years I have been employing a procedure whereby a better view can be secured in certain cases, wherein the anatomical formation permits, and in which the examination as usually made is unsatisfactory, owing to the narrow opening above alluded to. I direct the patient to turn on the chair to the extent of 90 degrees so one shoulder will be turned toward me, when, without changing the position of the body, the head only is rotated frontward to the maximum degree as I make the examination. By the tortion thus secured, the naso-pharyngeal opening is changed from an oval to triangular shape with the base thereof at the rear, and into this widened base I so place the mirror as to obtain an excellent view

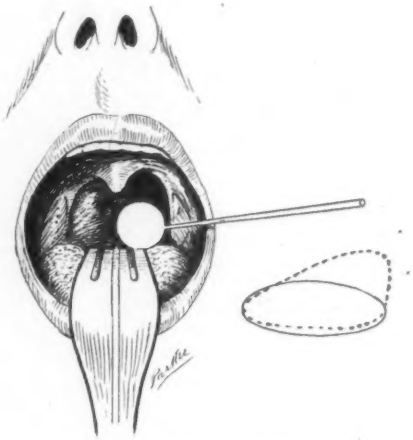

Fig. A. Lateral Posterior Rhinoscopy.

of the opposite half or the naso-pharynx. By reversing the position of the patient, the other side can in like manner be examined. In this way, I can often use a larger mirror than would be tolerated when the usual method is practiced. Furthermore, as the mirror is also further away from the point of observation, a larger field can be seen. This procedure is well illustrated in Fig. A. While employing this method, a soft palate retractor is never required.

In order to obtain a better view, when the examination is being made from the front in the usual manner, it is not infrequently desirable to use some form of soft palate retractor. Latterly I have been using my compressed air aspirator, as shown in Fig. B, which

is of particular value when the uvula is enlarged. During this procedure the patient must handle the tongue depressor.

At times, however, there are cases encountered wherein gentle means are of no avail, when I employ a method which I formerly described in a paper entitled "Pharyngeal Adenoids" which was published over seven years ago.[1] The introduction of a small rubber tube through one nostril and then out of the mouth and, after sufficient stretch is given, the tying of the two ends in a bow knot over the upper lip has been frequently shown and by different writers. I have never been able to obtain any satisfaction from

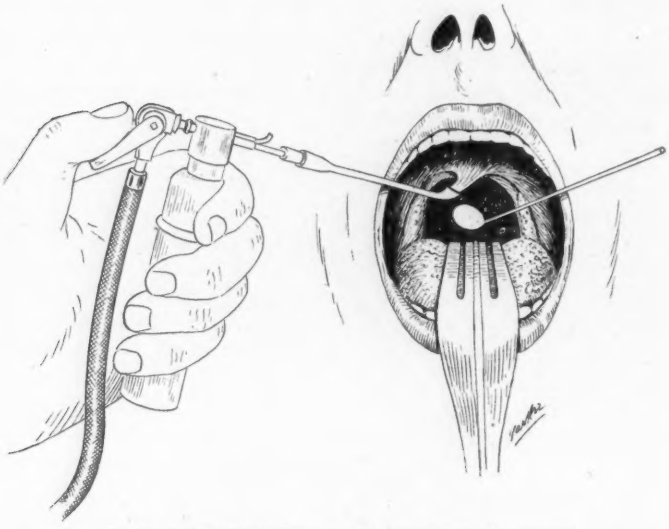

Fig. B. Pulling Uvula Forward with Compressed Air Aspirator.

this method for different reasons: *First.* The rubber tube, owing to its size, occludes the inferior meatus in one nostril so as to preclude a simultaneous anterior examination of that nostril. *Second.* The bow knot is highly unsatisfactory, as it slips and furthermore soon becomes foul and slimy from either blood or nasal secretions. *Third.* The soft palate is so stretched as to make a narrow triangular slit anteriorally, which is not an ideal form to give the best results. *Fourth.* It is excessively disagreeable to the patient who can neither expectorate nor swallow, and the only way to give him

a rest or relief is by complete removal of the tube. With these important and numerous objections it seems strange that different authors for so many years have continued to copy its description from predecessors.

My method is clearly illustrated in Fig. C, and requires the use of a solid elastic cord 5-32 of an inch in diameter, and about two feet in length. These cords, of different sizes, are employed by the general surgeon as ligatures. I find the next larger size (3-16 inch) is too large and clumsy, while the next smaller size (⅛ inch) stretches out too fine so as to be painful when sufficient tension is

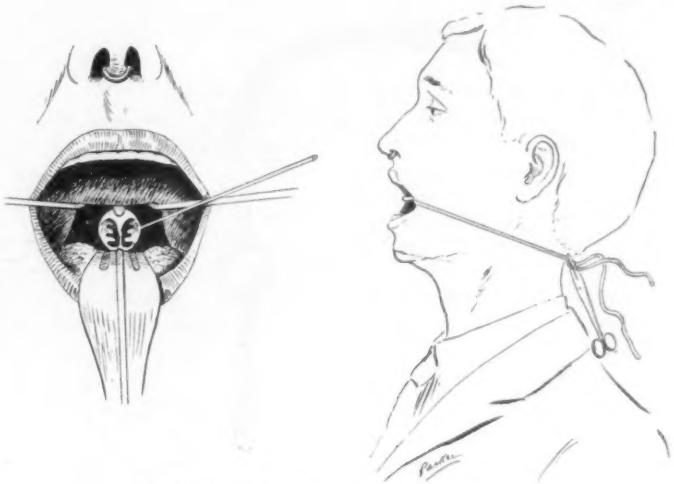

Fig. C. Use of Elastic Cord as Soft Palate Retractor.

employed. After suitable cleansing, and while still wet, one end of this cord is passed along the floor of one nostril until it can be seen back of the soft palate, the patient meantime holding down his own tongue, when it is grasped with a forceps and drawn out of the mouth on the same side. Next, the opposite end of the cord is passed in a similar manner through the other nostril and out from the mouth on that side so the middle of the cord rests close to the upper lip and against the nasal partition. Lastly, sufficient tension is given either end so that the soft palate is drawn well forward, when the ends are passed backward from either angle of

the mouth and crossed at the back of the neck, where they are securely locked by a strong scissors artery forceps.

When the cord is thus applied the nose can be easily blown and cleansed and the mouth can be tightly closed. Even though spasmodic action of the soft palate is induced, it will soon subside under the elastic pressure owing to the much greater length of cord employed than by the antique method previously alluded to. As one end is drawn to either side of the mouth the anterior edge of the naso-pharyngeal opening instead of being V-shaped is shaped more like a U with a flattened bottom, which gives far more room for either examination or operation. Furthermore, when the soft

Fig. 1. Tongue Depressor with Saliva Ejector. (¼ size.)

palate tires from the tension, or when the patient desires to swallow, all tension can for the nonce be removed by the patient simply pulling forward upon the cord when grasped over the cheek by a band on either side. As soon as this hold is released, the elasticity of the cord is again operative and the soft palate is held forward as before. This interruption can to a large extent be avoided by the use of a dental saliva ejector or other aspiration device. Personally, I prefer my tongue depressor with saliva ejector attached (Fig. 1). Lastly, while in position with the stretched cord in either nostril so slight a portion of the area of the opening is encroached upon that an anterior examination with a nasal speculum

can be made at any time. As described this method of retracting the soft palate is of inestimable value during major operative procedures in the naso-pharynx.

The adenoid growth or enlarged pharyngeal tonsil, when not removed, passes through much the same atrophic evolution as does the faucial tonsil in its change from hypertrophy to submersion. In its destruction by nature's process, there follows a sort of flattening out whereby the normal concavity of the vault of the pharynx is so filled that it presents a flattened or plane surface instead of the normal curve, which should be easily recognized by posterior rhinoscopic examination, though, as there remains no protrusion, the flattened surface may be regarded as normal by the examiner unless his attention has been particularly directed thereto. By this examination, the mucous membrane of the naso-pharynx will generally be found to be more red than normal, and not infrequently there will be resting upon this flattened surface some visible inspissated secretion. The patient usually reports the presence of a post-nasal catarrh.

With the mirror in proper position, if the examiner will pass through either nostril near the floor a delicate applicator, the end of which is tightly wrapped with a small tuft of cotton, he will find that the cotton-wrapped end of the applicator can be easily made to enter to the extent of about one-fourth inch into the soft tissue which causes the vault of the naso-pharynx to be flat as described. While the pathologic tissue alluded to may not be as much as one-fourth inch in depth, the applicator will enter to this extent, as it is inserted at an angle to the surface thereof. In this way, the diagnosis can be easily confirmed. In certain cases wherein this condition is present, there will be observed one or two vertical slits which have been named pharyngeal bursae or Luschka's crypts. It seems to be a self-evident proposition that these bursae or crypts can only exist when there is present the degenerate adenoid, and that no such depressions can ever be found in or upon the normal smooth mucous membrane covering the vault. These bursae, when present, serve like the tonsillar lacunae as a resting place or exit for mal-secretions.

In our standard text-books, but rare and brief allusions to the fossae of Rosenmueller are to be found, at least as regards any pathologic import they may have. Attention is called to synechiae or web-like strings reaching across from the tubal prominence to the pharynx, and, as when they exist, they retain secretions, and

have an uncanny look, it is suggested that they be destroyed. At the meeting of this society last year a paper was presented by Dr. Thos. L. Brunk[2] in which he gave the results of his investigation of these fossae and reported favorable results obtained in many cases by a thorough curettement thereof when abnormally shallow; that is, when not possessing their normal depression, owing to a deposit of soft granular tissue, which is easily removed by the finger nail. During the operation the patient generally experiences a crackling sensation and hears the breaking down of the spongy tissue. This condition of the fossae is often observed in patients who complain of stuffiness of the ears, impaired hearing, tinnitus, and hoarseness.

The purpose of this paper is to call particular attention to these two locations which are so often a resting point for soft or friable deposits of degenerate tissue, the pathologic nature of which is clearly proven by the prompt cessation of unfavorable symptoms after its destruction. Other abnormal conditions of the naso-pharynx will be cited, though their correction is fully indorsed by all authorities.

Pharyngitis hypertrophica lateralis is a condition quite often observed, in which an enlarged band at either side of the pharynx just back of the posterior pillars is present and may extend upward considerably beyond the point of attachment of the soft palate. The mucous membrane covering thereof is generally more red than normal and both wrinkles and bulges forward when the patient gags. Their irritated condition is frequently proven by the patient acknowledging discomfort when they are touched by a probe. Granular pharyngitis is considered in all text-books. In the writer's experience it is more symptomatic than real, and is always due to other troubles which, when corrected, usually cause a fading away of these granules. Hence no special treatment thereof is required.

The anterior boundary of the naso-pharynx consists of the choanae with the intervening septum and the posterior ends of the turbinals upon their outer borders. In order that the respiratory functions of the nose may not be interfered with, these choanae should possess certain features which are required in the normal nasal passages. No hypertrophied condition of the parts should be present whereby drainage or breathing are obstructed, or whereby the course of the passing air current is deviated from its path. When these desired features of structural formation obtain, the

mucous membrane is of the normal pink color, and no retained secretions are visible; furthermore, no two opposing surfaces touch each other.

One form of hypertrophy not infrequently observed is a pale bulging on one or both sides of the vomer near its posterior end and opposite the posterior end of the opposing middle turbinal. These growths are chiefly detrimental through their deviating the course of the air current, which has been thought by one writer to be a common cause of tubal catarrh, as the incoming air current is thereby caromed against the Eustachian prominences so as to be both irritating and drying. Aside from such deviation of the air current, these growths, by diminishing the area of the choanae, serve like any other obstruction at this point as a producer of alternate rarefaction and condensation of the air in the post-nasal space, and are thus harmful.

Enlargement of the posterior end of the middle or inferior turbinals is another condition quite often observed, and, while such enlargement may be acute and hyperaemic, it is more often a true hypertrophy having at times the appearance of polypoid degeneration, and, like similar conditions of the soft parts in the nasal passages, yields a more or less excessive and often tenacious secretion which generally passes for post-nasal catarrh.

Lastly, the choanae are at times obstructed by nasal polypi, usually myxomatous, though occasionally there is found instead a so-called fibrous polypus. In fact, fibroma may grow from most any point in the post-nasal vault. In this paper these two latter conditions will not be considered.

Any obstruction of the choanae has an unfavorable effect upon the voice, and requires the vocalist to make a greater effort in order to attain the desired note. Such increased effort, or straining of the voice, is an undoubted factor in the production of those laryngeal troubles so often found in the vocalist.[3]

The operative procedures required in order to correct the several conditions enumerated are comparatively simple for one familiar with rhino-laryngologic manipulations.

The hypertrophied lateral bands of the pharynx are best destroyed by parallel linear incisions made with the galvano-cautery point, which is painless with local anaesthesia. During the operation it is desirable that a soft palate retractor be employed, the patient meantime holding his tongue down firmly with a tongue depressor. By having a rhinoscopic mirror in position, the oper-

ator can easily locate and guide the cautery when above the velum. For patent reasons the incisions are best made from above downward.

For removing the soft and degenerate adenoid tissue in the vault, the ordinary adenoid curettes are not suitable. I have for some time been using a special curette with double cutting edge, whereby the vault can be easily cleared. During its use it is better to retract the soft palate while the patient holds down his tongue with a depressor. Under local anaethesia no particular pain is complained of, and, as this is a condition peculiar to adults,

Fig. 2. Naso-Pharyngeal Curette. (2-5 size.)

a general anaesthetic is never required. In order to anaesthetize the field I pass a cotton-wrapped applicator through either nostril so the cocaine rests against the tissue to be operated, for about ten minutes. Lastly, just before operating, I make a further application of the anaesthetic, usually a 10 per cent. solution, by use of a post-nasal applicator. I might here add that each of my different per cent. solutions of cocaine contain one-half as much phenol as there is of the cocaine, which seems to intensify the anaesthetic effect and tends to also diminish systemic intoxication. Furthermore, the solutions so made will keep indefinitely, and the antiseptic quality of the phenol is of undoubted advantage.

Fig. 3. Modified Meyer's Ring Curette. (2-5 size.)

For many years I have had in my outfit a Meyer's ring curette of the original pattern, which is straight and has only one cutting edge. Some time ago I had the previously dull back made sharp and the end given a slight bend. With this instrument passed through the nose, these described growths could be easily removed, though I have not put it to use, as the previously described curette has always seemed to be the preferable instrument. In a patient with roomy nostrils and an extremely sensitive throat, this

latter described modified Meyer's curette might prove to be the instrument of selection.

For curetting the fossae of Rosenmueller, I have found no instrument to be the equal of the finger nail. In operating the patient's right side, I use my right index finger, and for the patient's left side the index finger of the corresponding hand. While operating, the cheek of the patient is pressed between the teeth with the operator's middle finger, as the head is firmly held with the opposite arm, the same as when introducing the finger into a child's post-nasal space for diagnostic purpose. In this way, my method differs somewhat from the plan followed by Dr. Brunk. After cocaine anaesthesia, I have found that the patient rarely regards the procedure as being particularly annoying. Following the curettement, the wounds should be gently massaged a few times with a 40-grain solution of argentum nitras.

Fig. 4. Nasal Cautety Electrode. (Full size.)

For the destruction of soft posterior hypertrophies, either side of the vomer, the galvano-cautery is all-sufficient. After anaesthesia, the cautery electrode (Fig. 4) is passed through the anterior naris of one side, and its point is properly located by use of the posterior rhinoscopic mirror. The proper distance to enter the electrode can be roughly ascertained by first introducing a cotton-wrapped applicator to the hypertrophied point as seen by the post-rhinol mirror, then, by grasping the applicator even with the tip of the nose, the distance back therefrom to the hypertrophy can be measured, when, by laying the applicator upon the electrode, the approximate point which should be even with the tip of the nose can be noted, or even marked by the placing of a small elastic band upon the shaft of the electrode, which is introduced, tip down, and then, when far enough in, is rotated up against the hypertrophy. Generally two short parallel linear incisions are required.

For operating upon the posterior hypertrophied tips of the turbinals, either the same cautery point may be employed, or, still better, the hot snare, if the loop can be made to engage the bulging end. For an anaesthetic, some one of the substitutes for cocaine, as alypin, had better be selected, as cocaine often causes too much contraction of the point to be operated upon, so that it will not so readily engage the snare. The distance the snare should be entered can be ascertained, as before described, by the use of the measuring cotton applicator. As the snare loop is much more bulky than the cautery point, therefore causing retching, it must be employed without the help of the post-nasal view. By having a slight bend in the canula, the loop can generally be coaxed to engage. A hot snare takes a quicker hold without slipping than does the cold snare, and additionally gives the advantage of both cautery destruction and contraction. Furthermore, the danger of hemorrhage is reduced to a minimum.

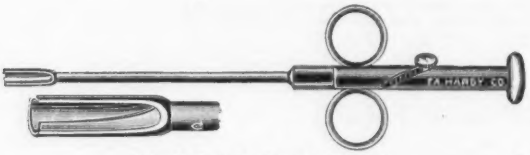

Fig. 5. Tubular Shears. (⅓ size.)

While I have employed the hot snare in the manner outlined upon many occasions without unfavorable results, there have been reported cases wherein an otitis media has followed the use of the cautery in this region. Hence, a preference is expressed by some for the cold snare, while others advise a cutting operation. Never having found a cutting instrument for this purpose which gave promise of efficiency, I have recently had constructed by F. A. Hardy & Co., of Chicago, a tubular shears which I think will fill the several requirements. By its use a considerable portion of a posterior turbinal hypertrophy can be amputated. In fact, it can also be employed while operating upon the depending portion of the anterior hypertrophy of an inferior turbinal. When used in operating a posterior hypertrophy, its proper position can be secured by having a finger in the post-nasal space. When more than one post-nasal operation is required, it is wiser to allow a few days to intervene between the succeeding attacks.

After the removal of all pathologic tissue in the naso-pharynx, as described, the mucous membrane lining thereof will soon assume the normal pink color of health unless there are remaining pathologic conditions of either the nasal passages or the faucial tonsils, either or both of which will contribute toward keeping up an irritated condition of the naso-pharyngeal mucous membrane. Good results are invariably obtained by operating upon any or all of these conditions alluded to, when found. I have been much impressed with the great benefit derived from curettement of the fossae of Rosenmueller when filled with soft tissue as described. In several cases there has promptly ceased a sensation of fullness of the ears as complained of by the patient. Tinnitus has in several cases been improved or eventually cured, and in one case within twenty-four hours, with no recurrence to date, the operation having been done over six months ago. Equally favorable results have followed curettement of degenerate adenoid tissue, particularly in the way of correcting unfavorable otitic manifestations, while asthma has been as promptly relieved by the hot snare removal of posterior turbinal hypertrophies.

103 State Street.

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TWO CASES OF EXTENSIVE CHOLESTERIN INFILTRATION OF THE MASTOID CELLS.*

BY EDWARD BRADFORD DENCH, M. D., NEW YORK.

Cholesteatomatous deposits within the middle ear, as the result of a chronic suppurative inflammation, are by no means uncommon. In almost every case of chronic suppuration, in which a radical operation is performed, cholesteatomatous masses, varying widely in size, are found in the tympanic vault. Exceptionally, these cholesteatomatous masses involve not only the tympanic vault, but to a greater or less extent, the entire mastoid apophysis. Under these conditions, the cholesteatoma consists of a mass of superimposed epithelial cells forming a tumor which, by its gradual increase in size, has caused the absorption of the bony trabeculae separating the mastoid cells, until the entire mastoid process is converted into one large cavity. In this epithelial mass we find a certain amount of cholesterin. In the cases which I am about to report, however, the true cholesteatomatous tumor was insignificant in size. But in each instance, all of the mastoid cells were infiltrated with cholesterin.

The *first case* was that of a young woman, 17 years of age, who had had a suppurative otitis upon the right side for twelve years. At no time had the suppuration been very profuse. The patient had been under the observation of a competent otologist, who had contented himself with keeping the ear thoroughly cleansed, and as the patient had had no acute symptoms, operative interference did not seem imperative. As the discharge continued, however, at intervals, he finally referred the case to me.

The patient gave a history of having had occasional attacks of vertigo and recurrent attacks of discharge from the right ear at intervals. There was a history of some mastoid tenderness. When I saw the patient, the temperature was normal, there was no pain in the ear, although pressure over the mastoid elicited considerable tenderness. The patient was somewhat nervous, and it should be stated that pressure over the opposite mastoid was also painful.

In view of the history of this case, a radical operation was performed, and a small cholesteatomatous mass was found in the mas-

* Read before the Annual Meeting of the Middle Section of the American Laryngological, Rhinological and Otological Society, held at Cleveland, February 22, 1907.

toid antrum. The mastoid cells throughout were deeply congested. The cells below the antrum, down to the very tip, presented a peculiar appearance. Instead of the glistening lining characteristic of the healthy mastoid cells, the lining membrane of these cells, wherever exposed, was dull in color, and the bone when removed either with the gouge or rongeur, did not present the characteristics of healthy bone. I can compare the texture of this bone to nothing but that which might be found if the normal mastoid cells were filled with wax. In the course of the operation, it was necessary to ablate the entire mastoid process.

From the appearance of the bone, I was inclined to believe that the process was a tubercular one, and consequently, sent several specimens to the laboratory for examination. The pathologist's report showed an infiltration of all the mastoid cells with cholesterin, even the cells at the tip being involved. The pathological findings throughout were peculiar, in that cholesterin was found everywhere, but very few germs were found in any part of the mastoid. The condition was one entirely new to me. I have had no opportunity to search the literature upon this subject, but do not remember reading of a similar case.

It seems to me quite possible that a cholesterin infiltration of this character might explain the rapid breaking down of the mastoid process in many cases of chronic suppurative otitis media, which have remained quiescent for a long period, and it is for this reason that the history is reported so fully.

In this instance, the patient made a rapid and uninterrupted recovery after the radical operation.

In a *second case,* occurring in a young woman of 26 years of age, practically the same condition was found. In this case, the otitis media came on after typhoid fever, and had existed for three years prior to operation. There was a history of recurrent attacks of acute suppuration during this period. None of these attacks, however, had been severe. At the time of operation—which was performed on account of the history of recurrent suppurative attacks—the same condition, as detailed in the preceding case, was found, namely, cholesterin infiltration of all of the mastoid cells, with a not very extensive cholesteatomatous mass in the mastoid antrum.

This case also made an interrupted recovery after the radical operation.

These cases are reported in detail, because, so far as I know, attention has not been called to this condition in otological literature.

In operating upon cases of this character, the question naturally arises whether it is necessary to ablate the entire pneumatic structure of the mastoid, where this condition exists. It has ordinarily been my practice, in performing the radical operation for chronic suppuration, to limit the operation to that part of the mastoid which showed gross evidences of disease. While in the majority of cases where the radical operation was performed, as the lower mastoid cells were usually either absent or were very small, it has never been my practice where these cells have appeared healthy, to ablate the entire mastoid. As soon as normal cell structure was reached, I have concluded my operation, and the results have always been satisfactory. In the two cases under consideration, however, the cholesterin infiltration of these cells seemed to constitute a peculiar factor, sufficient to warrant the complete ablation of the mastoid. It is possible that these cases might have recovered if the antrum and adjacent cells alone had been cleared out and the radical operation performed in the usual manner, without removal of the mastoid tip, even although this part of the mastoid contained cholesterin. Personally, I should be unwilling to terminate the operation at this point, and I believe that the condition described may constitute a factor in cases where suppuration persists after an apparently complete radical operation.

All of us who have performed many radical operations know that this procedure is not uniformly successful in causing a complete cessation of suppuration. In the majority of cases where slight suppuration persists after the operation, that portion of the middle ear about the tympanic orifice of the Eustachian tube is at fault. While this condition is annoying, I do not consider it dangerous. There are certain other cases, however, in which although no diseased bone can be detected in the cavity left by the radical operation, slight suppuration continues. It is a question in my mind whether, in some instances, certain cells containing cholesterin deposits have not been overlooked.

I believe it wise, therefore, in every instance where the slightest doubt is present in the mind of the operator, as to the fact of the lower portion of the mastoid being normal, to give the patient the benefit of the doubt, and to ablate completely the entire mastoid process so as to eliminate every possible focus of disease. In

the cases detailed above, although the operation was very extensive, recovery was exceedingly rapid. One case was practically dry at the end of three weeks, this case being one where primary grafting was employed, and the other case was well at the end of about five or six weeks. In this latter case, owing to the necessary extensive exposure of the lateral sinus, primary grafting was out of the question, and at a secondary grafting, performed on the fourth day after the operation, it seemed advisable to introduce only a meatal graft just sufficient to cover the margins of the enlarged meatus. In spite of the extensive operation, however, recovery was exceedingly rapid.

From an increasing experience, it seems to me that the more radical we are in these radical operations, the quicker the patients recover.

17 West 46th Street.

The Anatomy of the Lymphatic Vessels of the Middle and External Ear. A. MOST. *Archiv f. Ohrenheilk.*, April-May 1905.

The capillary lymphatics of the ear form a continuous network of vessels, extending from the auricle through the drum-membrane and middle ear and the Eustachian tube, and continuous with the lymphatics of the pharynx. The lymphatics from the anterior and upper walls of the canal and the tragus empty into the preauricular glands, situated between the canal wall and the parotid gland. The lymphatics from the floor of the canal, from the lobule and lower part of the auricle empty into the infra-auricular glands, between the parotid and sterno-mastoid. From the greater part of the auricle they empty into the post-auricular glands, and from the posterior canal wall into the deep cervical glands. The latter, situated close to the internal jugular vein, also receive branches from all the above named glands. The lymphatics from the tube empty into the lateral retropharyngeal glands. These glands are the seat of retropharyngeal abscess in children. They disappear during adolescence, when the lymphatics pass directly to the deep cervical glands. The lymphatics of the tympanum could not be demonstrated anatomically. From the drum membrane they empty into the infra-auricular glands, and from the tympanic cavity itself, at any rate in children, they probably drain into the lateral retropharyngeal glands, and then into the deep cervical glands.

YANKAUER.

SARCOMA OF TONSIL TREATED WITH COLEY'S TOXINES.*

BY FRANCIS P. EMERSON, M. D., BOSTON, MASS.

Disappearance of New Growth. Recovery of Health. Recurrence and Death after Seventeen Months.

It is a well known fact that the behavior of sarcomata cannot be predicted either as the result of surgical interference or from medicinal treatment. In a recent study of the literature of sarcoma of the naso-pharynx treated by arsenic it seemed to be the consensus of opinion that arsenic in full doses was particularly efficacious early when there was no glandular involvement. Recurrences were practically unmodified in their tendency toward a fatal issue. Some remarkable cases of cure by a variety of measures have been recorded where the diagnosis has been confirmed by histological findings; but most cases of record have been reported too early to be of value.

A few undoubted cases have extended over a period sufficiently long to encourage us to use every resource that can promise any relief, however desperate the clinical picture. Among these may be mentioned Bosworth's,[1] which remained well for seven years. In this case active surgical interference was employed without internal medication. Israel[2] reported a growth of the pharynx accompanied by deafness, difficulty in breathing and speaking—cachecia with involvment of the axillary and sub-maxillary glands. The spleen was also enlarged. The symptoms all disappeared under arsenic and there had been no recurrence at the end of five months.

1905, March 29, M. Schmiezelow, at a meeting of the So. Danoise d'oto laryngo, reported a case in a woman of 68 years. The lateral walls of the pharynx, tonsils and fauces showed a hard non-ulcerated growth that involved the base of the tongue. The glands were enlarged. Histological examination showed lympho-adenoma. Under cacodylate of soda and X-ray treatment, at the time of writing the glands had entirely subsided and there was but a vestige of the local process. Other cases and measures might be added. The deep interest in any measure that will modify these aberrant cells or increase individual resistance, and even for a short time encourage these forlorn cases, prompts me to report the following, especially as the patient enjoyed several months of perfect health and comfort, regained her usual weight and at last died with less suffering than if she had been abandoned to her fate and charlatans.

Case. 1904, April 10, Mrs. C. S. B., widow, American, private patient, 64 years, born in Maine.

* Reported at a meeting of the New England Society of Otology and Laryngology, held at the Boston City Hospital, November 16, 1906.

Family History. Father died at 87 years. Mother died at 67 years of pneumonia. Paternal relatives died of phthisis. Two children and no miscarriages. In winter, Mrs. B. had been subject for twenty years to throat irritation and pains in the extremities which she called rheumatism. This was only an inconvenience, and never enough to confine her to the house. An old scar on the forehead was the site of a new growth which was thought to be malignant and destroyed by caustic four years ago. A bloody discharge from the left breast had existed one year. Eczema in earlier life. History of a fall six years ago, and since then the spine became sensitive when tired.

Present Illness. Following a sort throat seven weeks ago, the patient commenced to have a sense of fullness in the right tonsil while nursing a malignant case. April 10th her family physician sent her to me, when I found the following:

Examination. A large globular swelling at the site of the right tonsil, extended to the Uvula. Both anterior and posterior pillars were adherent, and the anterior surface was injected. This mass was resistent to the feel but not hard, and there were no axillary or cervical glands. No pain. She was a large woman, normally weighing two hundred and ten pounds. She felt weak and had lost twenty pounds. Throat felt dry and was very red. At first electrolytic needles were passed into the growth and the current seemed to contract the tumor, diminish the vascularity, and relieve the dryness. At this time, instead of any treatment it was my judgment to remove the mass with the cold wire snare. This was opposed by her physicians and friends and only consented to by the patient after giving away her effects and preparing for death. Under these circumstances I refused to operate and tried the electrolytic needles as above. *May 5th.* On account of rain, Mrs. B. neglected treatment for five days, and now the swelling was more pronounced with an anterior tubercle presenting. It was also apparent externally. *May 10th.* I commenced the administration of Coley's mixed toxines of erysipelas and prodigiosus. One minum in sterile water was injected into the site of the growth in the neck externally. The reaction was accompanied by a severe chill, palpitation, vomiting, intestinal pains followed by seven or eight movements in the twenty-four hours, and marked prostration. The dose was reduced one-half and then gradually increased to one minim twice weekly until May 24th, when no reaction occurred.

The external swelling was gone, but the throat remained full and the surface of the mass was ulcerating. There was a slight toxemia as evidenced by headache and drowsiness. *May 27th.* Two minims

caused no reaction except pain in the groin extending to the bladder. She had lost 28 pounds. The swelling had diminished, as the result of a large slough. She felt better and went out Decoration Day to the cemetery. *May 31st.* Three minims. *June 4th.* A fresh bottle from which four drops was used was followed by severe pain in the throat, and across the kidneys, and later hoarseness. Prostration became marked with the skin dark and mottled. Joint pains lasted through the night. Prostration continued three days. *June 11th.* Chill and prostration marked with pain across the kidneys and in the throat, accompanied by polyuria, nausea and swelling of the neck at the site of the injection. *July 2nd.* Injection in the arm on account of local soreness, of six drops, was followed by local swelling, nausea, cold sensation, diarrhea and febrile movement. *June 8th.* Seven drops was followed by nausea, excessive gas, palpitation, pain in the right leg and arm, which extended into the neck and mastoid region. The throat swells and feels prickly, the same as when injected into the tumor directly. Although these observations were recorded at these intervals, the serum was administered twice weekly. *Oct. 4th.* Patient's weight, which had dropped from 210 to 170 pounds, had now been regained to 195 pounds. There was one posterior lobe, the size of a cherry. The rest of the tonsillar tissue was about the same as the opposite side. For six months previous to the use of the toxins, she had had five bloody discharges from the breast. During the last six months, only one. Today the physical examination shows no metastases. No glands, liver and spleen normal. General health excellent. No pain in the tonsil for a month. Second microscopical report from Dr. Pratt says the tissue submitted is undoubtedly that of a spindle celled sarcoma. The presence of numerous mitotic figures indicate that it is still growing. This specimen was submitted to Dr. Mallory, and the diagnosis corroborated. *Oct. 25th.* Signs of recurrence over old area. *Dec. 27th.* Tonsillar tissue scooped out with thick edges. Both arms indurated, hot and swollen from the injections. *Jan 2d, '05.* In addition to the toxines, several X-ray treatments were tried. Although she reacts to the serum, there is no local effect on the growth. *Feb. 27th.* No injection since Feb. 1st. Metastases have appeared, and patient is failing rapidly. Died July 5th, seventeen months after the local manifestation.

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CHOICE OF ANESTHETICS IN NOSE AND THROAT SURGERY.*

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There are few subjects to which a student gives less attention during his college days than that of anesthesia. As Sir Frederick Treves has said: "There is a widespread impression that to give chloroform is a minor act—that the power comes with the granting of the diploma—and the significance of the procedure is sometimes emphasized by the remark: 'Well, if a man cannot give chloroform, what can he do?' This idea is being dispelled by the profession, slowly, to be sure (and sometimes only after one of you have had a most embarrassing experience), but nevertheless surely. I will, in the limited time allowed me for the discussion of so broad a subject, simply take up the agents most generally employed in the production of anesthesia for nose and throat surgery. No one anesthetic can be universally used if the best results are to be obtained.

The anesthetist must grasp the fact that every case of anesthesia is a study in itself, in the selection of the appropriate agent for safety and for the operator's convenience, fully appreciating that every case has its peculiar risks and after dangers which must be met in different ways in different individuals.

The relative mortality of the various general anesthetics is as follows:

Nitrous oxide, 1-100-000? (Luke.)
Ethyl bromide, 1-16000 (Patton),.
Ethyl chloride, 1-12000 (23 deaths in England in 1 year.) (Luke.)
Ether, 1-10000.
A. C. E., 1-7500 (1-2000),
Chloroform, 1-1000 (1-6000-Vaughn).
Anesthol, too early to judge (several deaths reported).

For the convenience of bringing the subject before you I will say that The Choice of Anesthetics is influenced by the following factors:

1. Type and condition of patient.
2. Age of patient.
3. Nature of operation.
4. Skill of the administrator.
5. Wishes of the operator.
6. General conditions.

* Read by request before The Oculists' and Aurists' Club, Columbus, O., Nov. 26 906.

TYPE AND CONDITION OF PATIENT.

It is a remarkable fact that an individual whose health is somewhat impaired by disease is often a better subject for an anesthetic than a person who is in the enjoyment of perfect health. Among the laity there is a widespread impression that if the heart is sound, all must go well, whereas, in about 90 per cent. of the fatalities under chloroform, at the post-mortem examination the heart is found to be perfectly normal. (Luke.)

Far more importance must be attached to the nervous disposition and temperament of the patient, and the amount of alcohol and tobacco he is accustomed to use. A healthy, vigorous male adult is by no means the best subject for anesthesia in many cases, although the heart and lungs may be in excellent condition and able to stand any strain which may be put upon them, yet, the subject will not pass so readily and smoothly into the anesthetic sleep, in most cases, as a less robust type of patient, but will show greater tendency, as a rule, to struggling and excitement, which will interfere with the respiratory rhythm. Anemic patients, and the subjects of tuberculous disease (if we exclude active pulmonary tuberculosis), are better anesthetised with ether than with chloroform, as their blood pressure readily becomes unduly depressed by the latter anesthetic.

Fat people always give the anesthetist some trouble when the method employed involves any air limitations, and to fully anesthetise a fat, short-necked person by means of any inhaler, without producing undue secretion of mucus and saliva, with the accompanying cyanosis, is well nigh impossible. For this type of patient, therefore, chloroform, preceded by ethyl bromide, given with plenty of air, is indicated.

Edentulous people are sometimes troublesome owing to the tendency to suck in the lips in a valve-like fashion, and obstruct the air way. Patients who have *adenoid growths*, and *enlarged tonsils*, says Kolisko, "are not good subjects for any anesthetic, and in dealing with them chloroform should, as far as possible, be voided, especially in the case of children, as the adenoids are often associated with the "status lymphaticus" and persistent thymus gland.

This I do not believe to be true if the chloroform be preceded by ethylbromide, as much less chloroform is needed when this is done. In nearly 100 cases of ethylbromide-chloroform anesthesia for the removal of adenoids and tonsils, I have seen no untoward symptoms, and 75 per cent of the patients were children. In fact, most authorities on anesthesia concede the preference to chloroform rather than ether in operating on children generally.

In goitre, angina Ludovici, or any condition involving much constriction of the air passages with accompanying dyspnea, great care is necessary to use no anesthetic or method of administration which will in any way hamper the breathing or cause cyanosis. Several deaths have occurred under nitrous oxid and ethyl chloride in such cases. Kocher and Berry refuse to use any anesthetic in these cases, owing to the great danger. I have twice used ethyl bromide in these cases with no complications. Asthma contra-indicates the use of ether. In cardiac diseases, especially valvular diseases, chloroform is often better borne than ether, but great care must be used with either of them.

In patients with cardiac myasthenia, simple or fatty, in dilation without hypertrophy and in diseases of the coronary arteries, chloroform is especially contra-indicated as is also nitrous oxide. In conditions of renal inadequacy, both chloroform and ether are to be used with great care, for ether congests the kidney unduly, aggravating the albuminuria, while chloroform often increases the degenerative changes in the kidney substance. Diabetic patients are bad subjects for chloroform, for after regaining consciousness they frequently become comatose and die from acetonemia.

Insane patients should have chloroform preceded by ethyl bromide.

AGE OF PATIENT.

The age of the patient has little to do with the choice of anesthetic except that in children there is a tendency to embarrassing secretion of mucus and saliva with cyanosis and stertor if ether is used.

SKILL OF ADMINISTRATOR.

Let us all agree that no man, however learned he may be, has any right to administer an anesthetic until by long and careful observation, extended research and common sense judgment, he has prepared himself to undertake a task in many cases more dangerous than the operation. I would not for an instant have you think that any anesthetic is entirely void of danger—even in the hands of an expert. But, gentlemen, who shall say that anything is safe in the hands of a tyro.

THE WISHES OF THE OPERATOR.

The wishes of the operator, with all due consideration of the patient's condition, etc., should be paramount, for it is obviously unfair to the surgeon and undesirable for the patient that the former should for one moment feel that he is embarrassed in his work in any way. (Luke.)

Further, in some cases, it may be desirable to commence with one anesthetic and continue anesthesia with another. Many deaths un-

der anesthesia have been due to persistence in the use of an anesthetic which, to *the initiated,* was obviously unsuited for the patient. The preparation of the patient is also an important factor.

GENERAL CONDITIONS.

What would your wishes concerning the choice of an anesthetic amount to if a brother of the patient to be operated upon had lately died as a result of anesthesia? Suppose he had died of ether. No matter what you desire, I think you would use some other agent. Or, if for any reason, the family or friends are prejudiced against any agent, don't use it. Or, if you prefer ether and have only chloroform at hand, I suppose you had better use the latter.

Now what anesthetic shall be used? Shall it be ether; shall it be chloroform; or what?

Since of all the operations performed upon the nose and throat and accessory organs, requiring anesthesia, the removal of tonsils and adenoids is perhaps as common as any, we will confine our remarks to the application of anesthesia for this one operation. Most of you use ether; some use chloroform; several use ethyl bromide, or chloride, either alone or assisted by chloroform or ether.

Why you should prefer ether to chloroform, or either of them to ethyl bromide, I have failed as yet to be convinced. When you wish to operate in the region of the naso-pharynx, it seems to me that you would want as little blood and mucus as possible. The blood or mucus acts as a foreign body and obstructs respiration, exactly what you do not want. All authorities agree that ether embarrasses respiration. Ether also causes the production of an excess of mucus; and raises the blood pressure and increases the hemorrhage. Now what have you gained by its use? Suppose you had used chloroform. The mucus would have been less; to be sure, the heart and blood pressure would have been some depressed, but how much? The chloroform stimulates at first, and hence since the anesthesia is only momentary the hemorrhage would be about the same. But you have not used a respiratory depressant. Also when you administer the ether, whether by open drop or Allis method, the apparatus is cumbersome and if the anesthesia is to be renewed for a moment, the whole face must be covered up. With chloroform, the small Esmarch mask or pad or gauze of the forceps is all that is needed and anesthesia can be renewed while the surgeon works.

My method, which I am inclined to think the best, when used by one who is experienced (and please note that I say in experienced hands) is called the *ethyl bromide method.* When the technic of ad-

ministration is modified by the giving of a preliminary hypodermic injection of scopolamine and morphine, I refer to it as the *scopolamine morphine ethyl bromide method."*

How shall I convince you that this method is better than the use of ether or chloroform? One of your colleagues informs me that he likes ether because he can trust it to a student. You can not trust my method to a student. Another tells me he is prejudiced against chloroform because he had a death from chloroform, with the resulting advertisement. Now, gentlemen, when you trust ether to a student or chloroform to an inexperienced old man, long in his dotage, what can you expect? Ethyl bromide would kill, too, if placed into the same hands.

My desire is to convince you of the merits of this drug, when handled by an anesthetiser. Let us compare the manner in which the patient passes under the influence of the anesthesia when the different agents are used.

ETHER.

Apparatus—Allis inhaler, can of ether. Average time to cause relaxation from 3 to 15 minutes. Amount used 1 to 4 ounces, depending upon how much runs through the mask into the patient's eyes, etc.

First Stage. Swallowing, cough, some holding of breath, rather more common than with chloroform. Pulse accelerated and pupils large and mobile; conscious but no pain. Teeth may be pulled and incisions made. Easily awakened and no sickness; no relaxation.

Second Stage, Stage of Excitement. Patient becomes abruptly unconscious; memory, volition and intelligence abolished; questions answered in nonsensical manner; *struggling, shouting,* singing in robust patients. "Ether tremor" is seen. Face flushed, conjunctiva injected and perspiration on face. Pulse quickened and robust in quality. Breathing inclined to be hampered during this stage owing to muscular spasm. Do not annoy the etherizer by pumping the patient at this stage; leave them alone. The spasm passes off soon and the patient enters the

Third Stage, True Surgical Anesthesia. The cornea is now insensitive to touch, muscular relaxation is present and extremities are flaccid. Breathing is regular and stertorous. Pupils respond sluggishly to light. Pulse full, bounding and regular and somewhat slowed down. Free perspiration.

The *complications* and *difficulties* arising during ether anesthesia are:

1. Overdose.

2. Respiratory embarrassment leading to failure. This may occur during first stage, independent of overdose, and pass away as anesthesia becomes deeper.

3. Heart failure due to overdose or heart disease, goitre, hemorrhage.

4. Foreign bodies as blood, mucus, etc., may pass into larnyx and trachea.

5. Apoplexy may occur when the arteries are brittle.

The *Contra-indications* according to Luke are:

1. Protracted operations on jaws or mouth.

2. Where cautery is used or where lights and fires are likely to cause an explosion.

3. In Bronchitis, Tuberculosis, Asthma, Emphysema.

4. Atheromatous arteries.

5. Renal diseases.

6. Empyema or ascites or pleural effusion.

7. *Large tonsils* or *adenoids.*

8. Brain operations, as mastoid, etc.

9. In all cases where mucus and secretions lead to respiratory obstruction or if patient's breathing becomes tumultuous.

CHLOROFORM.

Apparatus—Esmarch mask, small dropper bottle. Average time to cause relaxation 3 to 10 minutes. Amount used 1 to 4 drams. May burn patient's face. Motto of this drug, "Watch the breathing." Never worry about the pulse.

First Stage. Patient swallows and coughs slightly, restless, turns face away from anesthetic—if it is too close to his face he will hold his breath, and inevitably a long sighing respiration or gasp will follow. If this is borne in mind by the operator, he will save himself worry and embarrassment by leaving the patient alone and not jumping in and pumping the patient. This holding of the breath is only temporary and always passes away. Flashes of light, buzzing or hammering are heard in the ears. An exhilarating, thrilling sensation is felt through the body. Thoughts and ideas occur in the most rapid manner and are most vivid. Patient is conscious of surroundings but not of pain.

Second Stage. Patient now becomes rapidly unconscious. He will mutter, talk, laugh, talk nonsense, swear, respond irrationally to any questions. His conversation will run along the lines of his occupation. The face is flushed; the pulse is increased in rapidity. Pupils dilated and mobile and conjunctival reflex is still present. There is a tendency to sickness in this stage and any palor or depres-

sion of circulation in this stage should be taken as an indication for more chloroform. If the patient flushes and struggling occurs, chloroform should be withdrawn until the struggles subside.

Third Stage. The patient now becomes completely anesthetized. The breathing is regular and automatic like that of a sleeping person and often with a short quick snore. The pupils contract, but not always, and should react sluggishly to light. The lid reflex has disappeared. The muscles throughout the body are relaxed. The pulse is somewhat slower than normal and more compressible. The eye balls are fixed in a horizontal plane or rotating from side to side. You must be careful not to be misled by *false anesthesia,* especially in children, as the patient may be in a simple slumber. The pupil is then more contracted and even though the reflexes are absent, a pinch or cut will awaken them and the anesthetist is in a pretty fix. Therefore, when the pupil is very contracted, the administrator must be upon his guard to be sure of his ground before telling the operator to go ahead.

The *four signs* of full chloroform anesthesia are: 1. Automatic respiration. 2. Loss of conjunctival reflex. 3. Fixed and contracted pupil. 4. Muscular relaxation.

In *children* the *breathing* is all important; little reliance can be placed upon the pupil and less upon the conjunctival reflex. A useful sign, however, is the rotation of the eye balls downward upon the horizontal axis. However, in children it is especially well to give too little rather than too much, as we have no reflexes in children and there is danger of absolute poisoning.

The *principal troubles* arising during chloroform anesthesia, apart from chloroform poisoning, are:

1. Cessation of respiration.
2. Cardiac failure.
3. Vomiting.
4. Passage of food, mucus, etc., into air passages.

The *advantages* of *Chloroform* are:

1. Pleasant to smell and *seems* easy to administer. Produces little or no choking, so that children will often inhale it without resistance.
2. No special apparatus is needed.
3. Smallness of quantity required.
4. Quiet anesthesia.
5. Non-inflammable.

The *disadvantages* of *Chloroform* are:

1. High mortality.

2. Selective action on circulatory apparatus.
3. Depressant and protoplasmic poison.

ETHYL CHLORIDE AND ETHYL BROMIDE.

Now we come to the ethyls—ethyl chloride and ethyl bromide, as used in producing general anesthesia. Aside from chloroform and ether, ethyl chloride is used more extensively than any other agent. It has always appeared to be safe enough to trust to children. The ansethesia is produced in a few seconds without any struggling. There is no depression, nausea or vomiting and although it is very expensive, only 10 to 40 c. c. are consumed in the production of full surgical anesthesia. However, to get the best results a special mask must be used.

I used to think it about the ideal anesthetic, but when so great an authority as Mr. Luke, in his new work, reports 23 deaths in one year in England alone, I think that we should use a little caution before accepting ethyl chloride as a harmless anesthetic agent.

No such record of fatalities attends the use of ethyl bromide. The mortality, according to Patton, is only one in 16,000 anesthetics. I find record of only two deaths. I consider ethyl bromide (and note I do not say ethylene bromide) the ideal agent for short anesthesia. If the operation is to be a long one, I believe the ideal technic consists in producing surgical anesthesia with ethyl bromide and then continuing it with ether or chloroform *according to the type and condition of the patient.*

My method of producing anesthesia with ethyl bromide, used by me about 2000 times, is as follows: If the patient is a large man, or very nervous patient, or one of those big muscular hod-carriers that we see so often in the hospital, or for operations for the removal of tonsils and adenoids, I use what I call the *"quick method."* This consists of dashing about one fluid dram of the drug upon a thick piece of gauze, and applying the same closely over the face. The patient is simply smothered in it. There are one or two struggles and all is over. This will suffice to keep them asleep for from three to five minutes. If, however, a prolonged operation is intended, as soon as the patient relaxes, say in about one minute the cloth is removed and ether or chloroform adminstered. This does away with the terrificly violent exciting stage seen in these cases when ether or chloroform is given from the start. If the patient is very ill, not so nervous, or not so strong as to be able to overcome the anaesthetizer during the administration of the ethyl bromide, I use the *"slow method."* This consists in applying the Esmarch mask over the face, and then gradually dropping about thirty or forty drops of

ethyl bromide upon the mask, and in one-half to one minute the patient is sleeping quietly, and the same procedure as before takes place with reference to the ether or chloroform. The odor is not unpleasant, and scarcely any irritation of the air-passages is produced. If properly administered there is practically no stage of excitement. The face is flushed, the ears red, the eyes injected and the pupils more or less dilated. The heart action is accelerated, and the pulse increased in force. The respiration is quickened, and in some patients becomes snoring; but irregularity or arrest of respiration has never occurred. It does not produce nausea or vomiting. In fact, we seldom have any vomiting to amount to anything since I have been using ethyl bromide as a preliminary anesthetic. The duration of insensibility is brief, the awakening prompt, and there is little confusion of the mind when used for brief narcosis. In the fatal cases reported there is strong doubt, says Bartholow, in regard to the share of ethyl bromide in the result.

Any *untoward symptoms* during or following the use of ethyl bromide are due to one or more of the following causes:

1. Inexperience of anesthetist.

2. An impure article. Let me impress upon you that only a pure article is safe. I use Squibbs' only. It should be obtained in one-ounce vials and never allowed to stand around and decompose.

3. Some physicians have mistaken ethylene bromide for ethyl bromide. The former is very poisonous.

4. It should never be used about a gas light, as it is readily decomposed.

5. It should not be used in old men with sclerotic arteries without due caution. It should be borne in mind that when complete relaxation of muscles is required it is necessary to add a few drops of chloroform. One of the most serviceable uses of this agent is in the administration of anesthetics to the insane. Ethyl bromide is applied rapidly, and in less than one minute they are ready for the car. What under the circumstances would be a terrific exciting stage passes off quietly, and without the damaging effect of exertion upon the patient's strength.

There can be no doubt that many operations owe their fatal terminations to the large quantities of ether or chloroform given during the exciting stage. Mann of Buffalo (American Medicine, June 17), says that vomiting depends not on the kind of anesthetic used, but upon the amount. He always begins with ethyl chloride. Pneumonia, and injuries to the patient, as well as strain to the heart, are avoided by the elimination of the exciting stage of anesthesia. In

children the use of these agents is not only convenient, but necessary. Dr. Brown Kelly of Glasgow lauds ethyl bromide highly for operations about the nose and mouth, as removal of tonsils and adenoids, because it strikes the happy medium of combining the good points of chloroform, nitrous oxide and ether without their disadvantages, producing an anesthesia as quiet and free from asphyxial symptoms as chloroform, and as rapid as nitrous oxide, and as stimulating as ether.

The cost of ethyl bromide, bought as we buy it, is nineteen cents per ounce. The cost of ethyl chloride is eighty cents per tube. The amount of ethyl bromide used is about thirty to sixty minims, costing about one to two and one-half cents per application. Ethyl chloride leaves a garlic odor to the breath; ethyl bromide does not.

CONCLUSION.

For brief operations ethyl bromide is the best anesthetic. For preliminary anesthesia, this product is not only convenient, but I would impress you with the fact that there is less danger when the exciting stage is eliminated by its use. Ethyl bromide is better than ethyl chloride. Severe nausea and vomiting are seldom seen after prolonged anesthesia when this agent has been used as preliminary anesthetic. Ethyl bromide is a heart stimulant and not depressant. This compound is absolutely safe in the hands of any man who understands anesthesia; nothing is safe in the hands of a novice. The average time for producing complete insensibility is from thirty to sixty seconds, but seldom longer than thirty seconds.

The *advantages* of ethyl bromide over chloroform are: 1. It can be given with the patient in any position. 2. Anesthesia is induced very much more quickly. 3. There is no struggling 4. A measured dose can be given. 5. It is much safer. 6. The after-effects are trifling or absent.

The *advantages* over nitrous oxide are: 1. The anesthesia is of a better type; quieter; absence of suffocative symptoms. 2. No cumbrous apparatus is necessary. 3. The available anesthesia is about twice as long.

The *advantages* over ether are: 1. Much pleasanter to take. 2. Induction of anesthesia is much quicker and no struggling. 3. There is no cyanosis or secretion of mucus. 4. Does not leave an unpleasant taste in the mouth or smell in the room. 5. The after-effects are much less.

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TURBINECTOMY.

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We should be very loath to enter upon a controversy upon any subject that was not dictated solely in the interests of truth and better knowledge of our work. It is with this in view that we venture to put forward this paper in the hope that the doubt and uncertainty which seems to surround this operation may be cleared away.

We are fully aware that to advocate total removal of the inferior turbinate will provoke adverse criticism from some members of the profession, chiefly it seems from those who have never performed the operation and who, therefore, base their conclusions on purely theoretical assumptions; while among those who have performed the operation there seems to be a very well founded belief that the operation is of great value.

The inferior turbinate thus occupies a unique and anomalous position in its surgical existence inasmuch as certain members of the profession fear its removal even when manifestly diseased. These same gentlemen have no hesitation in repeatedly searing its surface with hot platinum points or chemical caustics, however ineffective they may be in relieving the nasal obstruction; but they decry an operation that does satisfactorily remove the obstruction with an array of reasons none of which are founded on facts.

It is said that such an operation results in undue dryness in the nose and throat, that it renders the lower respiratory tract more liable to infection, that it induces an atrophic rhinitis with formation of crusts and odor, that the air will not be properly warmed on entrance into the lungs, inducing laryngeal and bronchial troubles, that it has some function of which we know not, that is essential to the animal economy and that its presence, however diseased, is sacred. The only objection we can find to all these statements is that they are not supported by the facts in the case as many operated cases will show, the operation in fact relieving in many cases the very things that the removal is supposed to cause.

During the past year we have removed considerably more than a hundred inferior turbinates, sometimes on both sides, and have never seen the distressing dryness that is spoken of. We have never seen it induce pharyngeal or laryngeal trouble or pathological conditions lower down. In fact, it usually stopped them by curing the

patient of mouth breathing. We have never seen crust formation or odor after the wound was healed unless there previously existed suppuration in the accessory sinuses. As far as the unknown function is concerned we can only say that we have never seen harmful results follow the removal. The patients all breathe better, have a better facial expression, are relieved of the necessity of continually clearing the nose and throat and the dropping of mucus from the naso-pharynx stops. By allowing for a free passage of air into the lungs, relieving all obstruction, infection and "catching cold" is much lessened or when it does occur is relieved of much of its disagreeable features, since the nose doesn't stop up. It has also a most favorable influence on the course of catarrhal deafness.

Briefly considered the inferior turbinates are attached to the outer wall of the nose near its floor. They are developed separately from the other turbinates and are not part of the ethmoid. They are the largest of the turbinates and extend from the vestibule backward, enlarging as they extend to terminate in a posterior free end very near the mouth of the Eustachian tube. They are composed of soft cellular bone covered with a thick mucous membrane, having large venous plexuses and capable of great swelling and reduction, containing in fact true erectile tissue. It is this power of expansion that makes the medicinal treatment of hypertrophic rhinitis futile. The posterior free end is especially liable to swell and when hypertrophied presents the appearance of a papilloma. It is this swollen end that is chiefly responsible for the involvement of the Eustachian tube and deafness in acute coryza. The third volume of Spalteholz's Atlas of Human Anatomy contains a beautiful cut of these structures and shows the relations to the surrounding parts. The function of these bodies, as far as we know, is to warm and moisten the air before it enters the lungs. They are not concerned in the sense of smell.

Sometime ago considerable discussion took place as to what path the air followed after entering the nose, whether it traversed the upper structures or the lower on its path to the throat. It appears to us, however, that it would follow the path of least resistance, regardless of its situation, as there is no reason why this law of nature should be violated in this instance. This has a direct bearing on the operation as there are some who insist that, as we breathe through the middle meatus, we should remove the middle turbinate in obstructive conditions.

Granting then that the structure is normal, it is most certainly to be let alone unless removal is required to gain access to other

regions, as in opening the Antrum of Highmore. When, however, these structures become pathological, as they do very often, especially in this climate, there seems to be no good reason why they should not be attacked and radically so. As far as we are aware, the credit of putting this operation before the profession belongs to Dr. Dudley S. Reynolds of this city.

The indications for the operation we would list as follows: (a) When the nose is too narrow for free respiration; (b) When there is difficulty in blowing the nose, with retained secretions; (c) A history of catching cold easily and mouth breathing at all times or only at night, with a dry parched mouth and tongue and large collections of mucus in the naso-pharynx which must be expelled every morning; (d) Cases where the two sides alternately open and close with one side always closed; (e) In very large turbinates of the nodular variety that do not shrink on the application of adrenalin and cocaine; (f) Where the nose is occluded on one side due to septal deformity which is of such a nature as to defy correction; (g) It is a matter of common observation that, in deflected septums, the inferior turbinate on the concave side of the deflection is hypertrophied, while in the majority of cases the one on the convex side is more or less atrophied. If, therefore, the septum is brought to the median line, as it should be, while it relieves the stenosis that existed on the convex side of the deflection, it causes a stenosis on what was the concave side by reason of the hypertrophied inferior turbinate. It is, therefore, advisable in such cases as are considerably hypertrophied to remove the turbinate first and allow that to heal before attempting the submucous resection. (h) To gain access to other regions as in the intranasal treatment of Antral suppurations with opening of the outer wall under the turbinate as practiced by Curtis and Richards. (i) To remedy other conditions, as in a chronic catarrhal state in the middle ear, if the nose is at all obstructed; and, in such cases, particular attention should be paid to the removal of the posterior end, a marked improvement in hearing often taking place after such work, particularly if the case is recent. (j) In chronic catarrhal conditions in the throat with cough, dropping of mucus from naso-pharynx and hypertrophy of the lymphoid tissues in the pharynx. (k) In many so-called rheumatic throats relief may be had when all other means fail.

As an adjunct in the treatment of Hay fever. The chief form of discomfort these unfortunates experience is due to obstruction in the nose and it is very clear that with a good free breathing space in the nose by removal of both inferior turbinates one of the chief

sources of discomfort is removed. It seems also to have a favorable effect on the eye as well as on the asthmatic seizures that are so distressing. The chief reason why many have reported unfavorably on the new remedy "Pollantin" we believe to be due to the fact that failure to first reduce the inferior turbinates prevented the remedy from penetrating into the nasal chambers. We have a number of patients who by means of this treatment have been so far relieved of their trouble that we can pronounce them cured.

This operation has proved so successful in our hands that it has practically superceded all cautery operations, which are not to be compared with it in efficiency. The more we see of cautery work, the more we are impressed with its relative insufficiency; for it must of necessity leave untouched the very part of the turbinate which gives rise to the most trouble—namely, the posterior end. Snaring off the posterior end with a cold wire snare is a better procedure than the cautery but is still not radical enough, the purpose being to effectually prevent any part of the turbinate from impinging against the septum and forming a source of irritation or infection.

The method of performing this operation is of the greatest importance for it can be made painful or painless, efficient or inefficient, according to the method employed. It is contraindicated in all acute troubles in the nose or adjacent structures. Pus in the accessory cavities should be removed as far as is possible.

We prefer to do the operation as soon after a meal as possible, as the patients seem to stand the cocaine better. Strychnine by the mouth also precedes the cocaine, which is used in conjunction with suprarenalin. The vibrissæ are first clipped, then the nose and throat are thoroughly cleansed with a mild alkaline spray and suprarenalin 1-3000 is instilled into the nose to shrink the tissues. Cocaine is now applied over the surface of the body of the turbinate by means of cotton wound applicators and rubbed in at short intervals, care being taken that no excess fluid runs down into the throat to produce a very disagreeable dryness. We wish to emphasize the fact that the anesthetic should be applied to the turbinate only. For this reason, we never spray cocaine or apply strips of cotton to the parts to remain in place, as this gives but an indifferent anæsthesia at best, and the excess fluid runs into the throat. We formerly used a cocaine solution of a strength of a drachm to an ounce of water slightly carbolated, but recently have been using the cocaine in powder form with only enough of strong cocaine solution or suprarenalin to moisten the cotton and hold the powder. Absolute anæs-

thesia can be obtained in this way in thirty to forty-five minutes.

Care must be taken to thoroughly deaden the upper posterior surface of the growth and under its shelving edge as the lines of the incisions are in these situations. After testing all parts with a probe to see that they are thoroughly deadened, any adhesions between the turbinate and septum or floor of the nose are broken up.

In case you have a very nervous patient where you must operate quickly and the bony structure is thin, especially in children, we pass Ballinger's swivel turbinotome to the posterior wall of the pharynx, slipping the knife edge behind the free end of the turbinate and with a steady pull remove the growth which usually comes out with the knife. It has been suggested that we engage the turbinate from the front and cut from before backward; this, however, does not seem to us so good a method as the forward cut, since a small shred of mucous membrane often remains attached which would be hard to remove on the posterior surface and if attempt were made to pull out the growth with forceps, considerable laceration of the mucous membrane would follow. By this method, too, the growth may be pushed into the pharynx, which would be disagreeable to the patient. After the growth is removed any loose shreds of mucous membrane are clipped with scissors, bleeding, which is very slight, is arrested, compound tincture of benzoin is applied to the wound as a protective dressing, and the nose is ready for packing.

The second method of operating is after freeing any adhesions to slip a thin bladed nasal saw with an up cut under the edge of the growth and push it back to the posterior wall. Then with a long easy sweep, without trying to force the instrument, saw through to the mucous membrane of the upper surface. This can be accomplished in about a minute. The operation is completed with Jackson's turbinectomy scissors, which are admirably adapted for the purpose, care being taken that the mucous membrane over the entire length of the bone is severed or when the forceps grasp the growth for removal the membrane will be stripped off any portions that remain and thus healing will be retarded. The growth will then fall to the floor of the nose and it may be a little difficult to see on account of the blood, but if the forceps are pressed well down no trouble need be experienced in removing it. As in the first method any loose shreds of membrane are clipped away, compound tincture of benzoin applied and the nose is ready for the packing.

At this point, it is a good plan to inspect the growth to see that it is all removed, particularly the posterior end. In looking into

the nose at this time the posterior wall of pharynx should be distinctly seen.

We always pack the nose after this operation, but instead of using the old fashioned long gauze strip, which was so painful and which could not be applied smoothly, we use strips of gauze ten inches long and one-half inch wide laid in piece by piece with a packer until the nose is quite full. This is similar to Dr. Otto Freer's method for packing after submucous resection of the septum. The projecting ends are cut off close to the nose. After the first piece of gauze is in position the thumb of the unengaged hand (no speculum is used) holds the strip in place while the second piece is being inserted, and so on. At first we used the gauze dry but now we use every other piece soaked in an antiseptic ointment, as it prevents sticking on removal and causes less pain and hemorrhage. Recently we have been putting the paraffin and wax splint we described in the *Journal of the American Medical Association*, Feb. 24th, 1906, next to the wound and packing the gauze between it and the septum.

After two days, the gauze is removed piece by piece, beginning at the bottom piece, as there is no wound there, and after this piece is started the rest can be removed with very little pain and no bleeding except for the last one or two at the top. A sharp hemorrhage lasting for several minutes sometimes follows removal of these last pieces but usually requires nothing more than a cotton plug in the anterior nares while a clot is forming. We have never had to resort to repacking, though at times we give ergot either by mouth or hypodermatically if the bleeding is free and the patient resides at any great distance from the office. The day we remove the packing we make no effort to clean the nose, simply allowing a firm clot to fill up the operated side. The next day, however, the nose is washed free from all clots and secretion and examined carefully to see that there is no danger of adhesions between the septum and remains of the turbinate which in some cases are capable of swelling to a remarkable degree. Our guide here is the posterior pharyngeal wall. If that can be easily seen past the whole operated area there is no danger of adhesions. If, however, it cannot, or where the nose is very narrow, we insert one of our paraffin splints to hold the parts separated. As this is apt to give rise to some pain, we have recently, as mentioned above, inserted this splint against the wound at the time of operation, packing between it and the septum, so that after the gauze is removed, we still have the splint holding the two surfaces sepa-

rated. This splint we allow to remain for one week and by this time all swelling is reduced and it is no longer necessary. As we said in our paper on the subject, after their insertion these splints give rise to no discomfort and have no tendency to harbor infection.

It takes about two weeks for the wound to heal; but only during the first few days does it demand any special attention. After that we have the patient report for simple cleansing and inspection every day or other day for two weeks. Occasionally a crust will be expelled at intervals for a longer period but this may be readily controlled by applications of 5 per cent Ichthyol Glycerine. With the healing of the wound all symptoms disappear and the patient is well.

Now the important thing, especially from the standpoint of the patient, is, what are the results of this procedure? In the first place, though almost a major operation, it is practically without danger. It can be accomplished without pain and with very little discomfort. It is not harmful in any way. In all cases, where indicated, it gives an almost certain prospect of cure without a chance for recurrence.

In simple stenosis of the nose or hypertrophic rhinitis, it is much superior to the septal or cautery operations because you remove the tissue at fault and get a much freer breathing space than with the others. By the cure of mouth breathing, it speedily relieves the disagreeable symptoms in the naso-pharynx and pharynx and will cure many patients whom the removal of adenoids has failed to relieve. Its beneficial effects in middle ear catarrh are due to establishing a large open nose for drainage and breathing, lessening the congestion and secretion and enabling the patient to cleanse his nose with less effort, lessening the danger of blowing mucus and infected particles into the middle ear. In Hay fever, by relieving the chief source of obstruction, it enables the patient to breathe through the nose, limits the burning and discharge and modifies the asthmatic and eye symptoms.

In conclusion we might say that we do not wish to leave the impression that all inferior turbinates should be removed or that we consider them a functionless body, far from it; but we do believe that when diseased they are amenable to the same surgical laws as are other structures of the body, and that they possess no such divine qualities as was intimated by some of the gentlemen who discussed Dr. Reynolds' paper at the American Academy of Ophthalmology and Oto-Laryngology at Denver in August, 1904.

Gaulbert Bldg.

PAPILLOMA OF THE LARYNX IN A CHILD.*

BY JOSEPH C. BECK, M. D., CHICAGO.

Theresa A., 5½ years old, hoarseness for about six months which is gradually increasing. An embarrassment in respiration, particulary inspiration. The last three weeks, this latter condition has been getting rapidly worse, so that at the time of presentation the child breathes very hard and labored, getting blue and perspiring, especially when sleeping. There is no history of any inflammatory condition or infectious disease previous to the development of this condition, no history or lues, tuberculosis or malignancy in family and no signs about the child of anything suggestive of such conditions. She is one of thirteen healthy living children.

Examination. A fairly well nourished child with negative findings in the nose, nasopharynx and oropharynx. Laryngeal examination was almost impossible, but, by the Kirschstein method one can see an infantile appearing epiglottis and some kind of an irregular growth closing the rima glottidis. No marked inflammatory signs surrounding this condition. The X-ray reveals nothing and the chest examination, as well as the rest of the body, blood, urin analysis negative. Three days and nights constant observation at the hospital showed the condition of choking rapidly increasing and this demands some kind of interference.

Treatment. Having in mind the probable diagnosis of a papilloma of the larynx and having looked up literature on the subject I came to the conclusion that it would be best to do a tracheotomy and observe the patient. This was done about 4½ months ago with the result of complete cessation of the obstructive symptoms and an uneventful recovery from the tracheotomy.

It has been stated positively by several writers, particularly L. N. McCreery (Laryngoscope, June 1906), also Wilson, and J. Payson Clark, that the simple procedure of tracheotomy sufficed to bring about a disappearance of this pathological condition and upon these authoritative statements I expected similar results. I am therefore very happy to state that this growth is rapidly diminishing and I wish to show the patient at this time in order that at a future period, when a complete cure has been established we might be better able to judge than if I were to show the case when absolutely cured.

I would be very happy if some gentleman, who may have had similar experiences, would state as to the length of time the tracheotomy tube may be left in place for it certainly causes a certain amount of irritation which is bound to cause a stricture of the trachea.

1220 N. Clarke Ave. Lakewood Station.

* Read before the Chicago Laryngological and Otological Society, October 16, 1906.

A CASE OF TUBERCULOUS ULCERATION OF THE TONGUE.*

BY JAMES T. CAMPBELL, M. D., CHICAGO, ILL.

Tuberculous disease of the tongue was formerly considered a late complication of pulmonary phthisis, but better clinical observations and microscopical examinations have proven that tuberculous nodules, fissures and ulcers may occur primarily. When tuberculous ulcers occur late in the course of pulmonary phthisis men are usually the subjects, due, possibly, to irritation caused by rough pipe stems and hot tobacco smoke.

A peculiar feature of the tongue (and this peculiarity was noted in the case presented) is the absence of typical formation of tubercles, giant cells rarely occurring and bacilli being scarce. In our case, there was simple proliferation of the epithelium and some round cell infiltration. Except for the fact that there was no dipping downward of epithelium, the tissue looked like epithelioma.

Tuberculous fissures are generally short, occurring at the tip or sides of the tongue, often stellate or branched and generally single. The fissures are really fissured ulcers without vascular granulation, but with slightly indurated margins. If the sharp-cut or beveled edges are drawn apart, the depth and breadth of the fissure will be found to be greater than a superficial examination indicates. The sides of the cleft are prone to caseate and break down, rapidly forming a foul and ragged surface. In the vicinity of the ulcer, yellowish-gray points or nodules are sometimes observed, but they break down into ulcers before attaining a growth the size of a pea.

At first an ulcer is indolent, not painful or sore. As the disease advances, however, it becomes so sensitive that the passage of the softest food causes excessive pain. About this time, salivation becomes a prominent symptom.

The lymphatic glands beneath the jaw are enlarged in the majority of cases, but not invariably so. The usual course of these ulcers is towards a fatal issue; but occasionally the superficial ulcers heal, although they may have existed for many weeks or months. The healing is usually temporary, however, for they break down again and the disease pursues its lethal course.

* Read before the Chicago Laryngological and Otological Society.

In the absence of other symptoms, the diagnosis of tuberculosis of the tongue is often extremely difficult. The diseases for which it is most frequently mistaken are syphilis and carcinoma, and oftentimes one can exclude these only after constitutional treatment and microscopical examination of excised sections.

History. The patient, M. S., aged thirty-three, lived a rather irregular life, the scars on his face and neck being signs of mortal combat. He has been in the County Hospital, where on two occasions, within the interval of one month, serious pleuritic effusion was aspirated.

For the past thirteen months, the patient has had morning cough and expectoration, but no night sweats, no wasting, no loss of appetite, and no appreciable elevation of temperature. He has been hoarse for six months, but as there was no pain, it was attributed to "a cold." Four months ago he noticed a small, painless fissure on the dorsum of the tongue, which has gradually increased in size, and now forms the present anterior ulcer. The smaller fissure appeared about one month later.

A smear from the depth of the larger ulcer was examined, but only pus-cells and streptococci were found. He would not permit excision of tissue for guinea pig inocculation.

Examination of the morning sputum showed tubercle bacilli in abundance. There was dullness on precussion over both upper lobes with increased vocal fremitus and moist rales in the infra-clavicular regions. The free border of the left vocal cord is deeply ulcerated and an infiltration with ulceration is present in the interarytenoid space.

Along the central line on the dorsum of the tongue, commencing 12 cm. from the tip, is a deep fissure of irregular outline, extending backward 12 mm. When opened it shows undermined beveled edges and is really an excavated ulcer 6 mm. in breadth.

Further back and to the left of the central line 30 mm. from the tongue's tip is a smaller fissure 10 mm. long, which is directed forward and outward. A short branch 4 mm. long extends toward the center of the tongue, forming a Y-shaped fissure. When opened it proved also to be an excavated ulcer.

There has been no glandular enlargement, and until recently, the ulcers on the tongue have occasioned no pain.

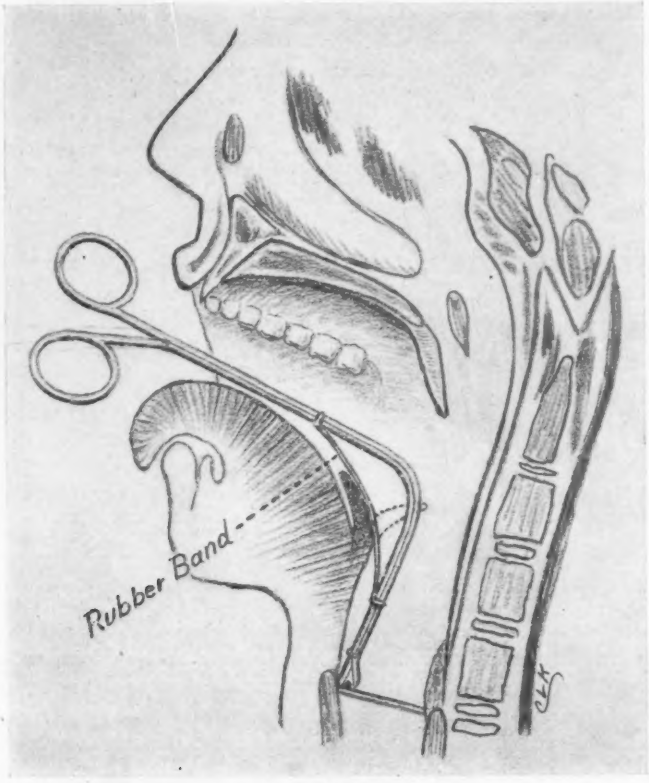
34 Washington street.

NEW INSTRUMENTS.*

BY LOUIS OSTROM, M. D., ROCK ISLAND, ILL.

SIMPLE EPIGLOTTIS RETRACTOR.

In operating on the anterior portion of the vocal cords, or adjacent parts, the anatomical structures at times interfere with exact

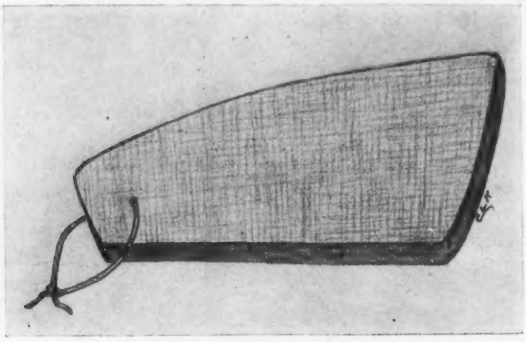


Simple Epiglottis Retractor.

manipulations. This is especially true as regards the epiglottis, which sometimes is very troublesome, overhanging the glottis,

* Presented before the Chicago Laryngological and Otological Society, December 11, 1906

and obstructing a perfect view in the laryngoscope. In a few cases, a clear view of the anterior end of the vocal cords cannot be obtained by any method, unless the epiglottis is held forward by some form of probe, even though we have a patient very tolerant to laryngeal manipulations and pull forward the tongue and place head and neck in the most favorable position. In such cases, which, of course, are rare, one needs another hand in order to do accurate work. A very simple contrivance will do away with the difficulty, and in no way interfere with any manipulation. It is an ordinary small rubber band fastened by a slip-knot at each end to the laryngeal instrument, so that an end is on each side of the angle. The action of the rubber band can be modified by



Method of Extracting Bernays' Sponge from the Nose.

using a short one or a long one, thick or thin; and by the use of a slip-knot each end can be moved to any desirable location to vary the retracting action. It does not in any way interfere with the movement of any form of forceps, curettes or applicators, nor does it slip if properly attached.

METHOD OF EXTRACTING BERNAYS' SPONGE FROM THE NOSE.

About the only objection against the compressed cotton (Bernay's) nasal sponges is the difficulty in removing them from any part of the nasal cavity excepting the anterior portion. If the nasal tissues have swollen, as is usually the case, it is not easy to see the packing, and the tissues are tender and sore, so that it is

quite painful to remove it, and portions may be left in the nose and produce subsequent trouble. Personally, I now use these sponges in nearly all my intranasal operations, submucous resection of septum, middle or inferior turbinectomies, spurs, etc., and find that after-treatment is reduced to a minimum with less liability to infection than when I used gauze. By running a strong thread through one end of the sponge, it can be placed anywhere in the nose, and as many as one likes may be used; and no matter how much the tissues swell up, all that is necessary is to catch hold of the knot and pull out the whole packing with the least amount of pain or injury. The sponge may be covered with rubber tissue, paraffin, or any other material if it is so desired, to protect the nasal mucosa.

LOCALIZER OF SUPERIOR OBLIQUE IN THE KILLIAN OPERATION.

I have seen four cases where diplopia was constant after the Killian operation (performed by some of the best European rhinologists), where the entire floor of the frontal sinus had been re-

Localizer of Superior Oblique in the Killian Operation.

moved. I have also seen very many where there was no diplopia after the operation. As long as there is any danger of diplopia after this very useful operation, when the pulley of the superior oblique is separated from its bony attachment, any method by which the pulley is made more safe is worth adoption. With this little instrument the exact location of the pulley can be found, and with no loss of time. The pulley can easily be felt by the index finger, and the ring of the localizer is then pushed in over it, so that the pulley is felt inside the ring. The needle or finder is then brought over the edge of the frontal bony wall and falls on the floor of the frontal sinus, exactly in the center of the ring, or over the attachment of the pulley. A mark can then be made, and this portion of the bone saved. The instrument can be quickly adjusted to suit any case. It is made by F. A. Hardy & Co., Chicago.

POSTERIOR SUBMUCOUS ELEVATOR.

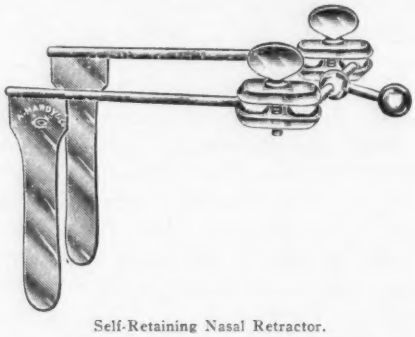
In an experience of over one hundred and thirty (130) submucous resections of the septum, I have found this instrument almost invaluable. Elevation of the mucous membrane of the septum is usually very easy with Freer's elevators, but I have rather often punched a hole in one side of the mucous membrane in going around corners and angles, when pushing backwards. I have seen many other surgeons do the same thing. I feel safer pulling than pushing, especially over the maxillary crest, so when I have elevated all the mucous membrane that separates easily with

Posterior Submucous Elevator.

Freer's dull elevator, I use this right-angle elevator almost exclusively, and find that I can do faster and safer work than ever before, and that there is much less laceration or traumatism, especially at the anterior end of the crest, where the toughest adhesions are usually found. Also at points where previous cautery or sawing operations have formed firm adhesions, it is very helpful in elevating from behind as well as from in front. It is an ordinary dental burnisher bent at right angles, which can be further modified into an acute or obtuse angle.

SELF-RETAINING NASAL RETRACTOR.

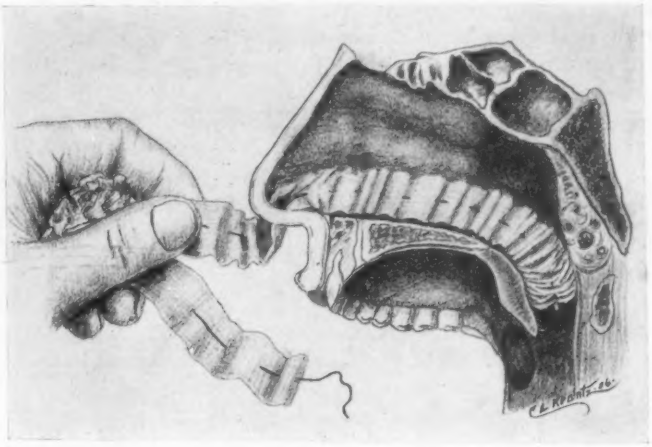
The self-retaining retractor shown herewith is universal in its movements, and is more easily managed than an assistant. The



Self-Retaining Nasal Retractor.

head band should be wide, so that it can be applied firmly to the patient's head. The arms and blades are pliable, so that any posi-

tion can be obtained with one or both blades independent of each other. By bending the blades, they can be used as a simple speculum, or deeper as retractors. No matter how the patient moves, the blades are always in the same position, and easily bent away so as not to be in the way if not needed. It does away with the disagreeable shifts produced at times when the assistant changes position or moves his body. It combines all the features of the different specula, with the additional substitution for the retracting assistant, giving us more room about the patient. It is made by F. A. Hardy & Co. and Von Mueller & Co., both of Chicago.



Simple Nasal and Post-Nasal Packing.

SIMPLE NASAL AND POST-NASAL PACKING.

Severe hemorrhage from the nose or post-nasal space is not uncommon. Packing the post-nasal space is easy if you have a tractable patient, but even then the gauze pad is not always easily adjusted, and it takes time and some apparatus, and bleeding interferes with accurate work. In packing through the nostrils it is still easier if the bleeding is not in the post-nasal space, but the great difficulty is that if gauze strips or anything else of the kind is used, it is very apt to fall down into the pharynx during gagging or hawking, and defeat its purpose. Furthermore, it cannot

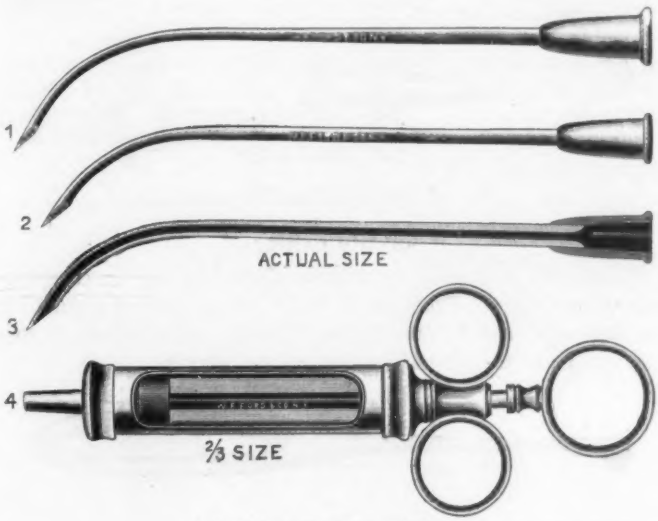
be packed very firm. Compressed cotton sponges (Bernays) are not suitable for post-nasal packing. In some cases of severe post-nasal hemorrhage, one of them in a haemophilic, all manner of packing had been used, with no avail, until I used the method to be described, which is so simple that it can always be used if we can get a string and a piece of cloth. It may also be used in any blind cavity. By tying one end of a string, preferably strong black silk, to one end of a gauze strip, and taking long stitches (basting or drawstring) through the gauze or strips, the gauze, with knot attached, is packed through the nostril into the nose or post-nasal space, and the string pulled on at times to pack from behind, until enough has been accomplished. The gauze may be treated with any kind of medication. If it is desired to pack the entire nasal cavity from post-nasal space forward, several such basted gauze strips of any desired length or width can be used and can be packed as firmly behind, by pulling on the basting string, as by packing from in front, with no inconvenience on account of any hemorrhage that may be present. The packing is easily and quickly removed by simply pulling out the gauze and letting the string slip through it, and, if necessary, it only takes a moment to repack the nasal cavity.

People's National Bank.

NEW NASAL INSTRUMENTS.*

BY J. H. ABRAHAM, M. D., NEW YORK.

These instruments are my very latest modifications, as they represent several alterations from the original idea. It affords me pleasure to present them before this Society.



Author's Antrum Syringe and Canula.

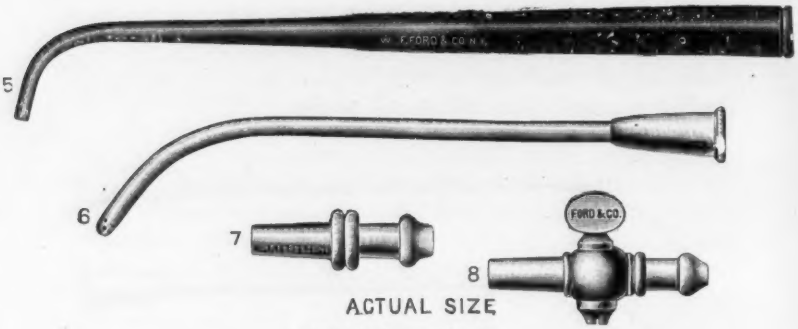
ANTRUM SYRINGE AND CANULA.

This syringe can be sterilized, as the packing is made of asbestos. The trochar and canula are made by drilling a hole through a solid graduated bar of steel, then filing to a point and curving the tip. The proximal end is twice the diameter of the distal end or tip, therefore combining great strength, delicacy and durability, as No. 3 illustrates.

Trochar and canula No. 1, is intended for the diagnosis of catarrhal or purulent lesions of the antrum and for the injection of solutions into the cavity through the middle meatus.

* Presented before the New York Academy of Medicine, Section on Laryngology and Rhinology, November 28, 1906.

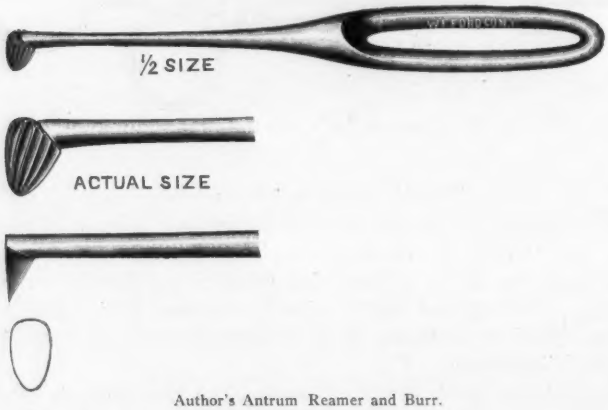
Trochar and canula No. 2, on account of its lesser curve, is intended for the inferior meatus. It is used in younger patients and narrower nasal cavities for the middle meatus.



Author's Antrum Canula.

ANTRUM CANULA.

Canula No. 6 is made from pure silver, and can be curved in any desired shape. The point is closed, but perforated around the circumference, and is intended for solutions and powders, so that they can reach the various recesses of the antrum.



Author's Antrum Reamer and Burr.

Canula No. 5 is made from hard rubber, in three sizes—1½, 2 and 3 millimeters. It can be sterilized, and while warm the distal end can be curved, and it is intended for all the sinuses.

The proximal ends of all of these canula are of the same dimensions, so that the syringe connections will fit. Connection No. 7 is intended to be used with a large piston syringe or with the douche. No. 8 differs only in having a stop cock, so that it can be attached to a large douche for office work.

ANTRUM REAMER AND BURR.

After perforating and cutting an opening through the inner antrum wall with the reamer, the burr is inserted and the opening enlarged; then pressure should be exerted on the burr in a backward direction, and the bone cut from in front, backward and downward. To remove the bone in front of the perforation, just reverse the procedure. The bone above and below is removed by scraping along the edges with the burr.

Author's Nasal Cutting Forceps.

NASAL CUTTING FORCEPS.

This instrument is a modification of Dr. Struyckens', and instead of the blades cutting from above downward, I have altered them so that the blades cut laterally. With this forceps a number of nasal operations can be performed.

I find it a most satisfactory instrument for partial or complete removal of the turbinates, either right or left; for the removal of the ethnoidal cells it is an ideal instrument, and for the submucous operations on the septum it answers admirably for the cutting of small pieces of bone or cartilage. It combines delicacy and strength, and places the hand of the surgeon out of the field of the operation.

With these instruments the complete antrum operation through the outer nasal wall, by way of the inferior meatus, can be per-

formed in from two to five minutes under cocaine and adrenal anesthesia, including the resection of the lower border of the inferior turbinate and curetting of the maxillary sinuses, with the aid of Myles' malleable curete.

NASAL SPLINT.

These beautiful illustrations amply demonstrate a most successful splint which I have utilized in my practice since 1897. The operator can make a similar splint in a few minutes by simply following these directions: A piece of Johnson & Johnson heavy gutta percha tissue, 8 cm. x 12 cm., is immersed in a cold 3% lysol solution for fifteen minutes or longer. Cut a piece of sterilized 5% iodoform gauze 5mm. thick, 2 cm. wide and 5 cm. long. Wash the tissue in a borax solution. Place the gauze near the end and in the center of the tissue, as in Fig. 1, and tightly roll the tissue around the gauze. Cut excess tissue from ends within 5 mm. of the gauze. Moisten thumb and index finger thoroughly in lysol solution, hold tightly the end of the splint and press the tissue together. Apply heat (preferably a lighted match) carefully to the end of the tissue when it gums together, and seal the end, smooth with wet fingers. See Fig. 2. Same technique for other end. With scissors cut a triangular piece of tissue and gauze from all four angles, exposing gauze. Cut five or six nicks through tissue and gauze above and below, also both sides, and the splint is complete as in Fig. 3. Any desired size splint can be made by altering any and all dimensions.

Swabbing the nasal vestibule and splint with sterile oil facilitates its insertion. The presence of this splint in the nasal cavity is absolutely painless, and never produces granulation. Drainage is perfect. Removal is free from pain and hemorrhage.

In nearly 200 intranasal operations where this splint was inserted I have never seen a patient who had one degree of temperature. The splint should be removed in two to three days.

616 Madison avenue.

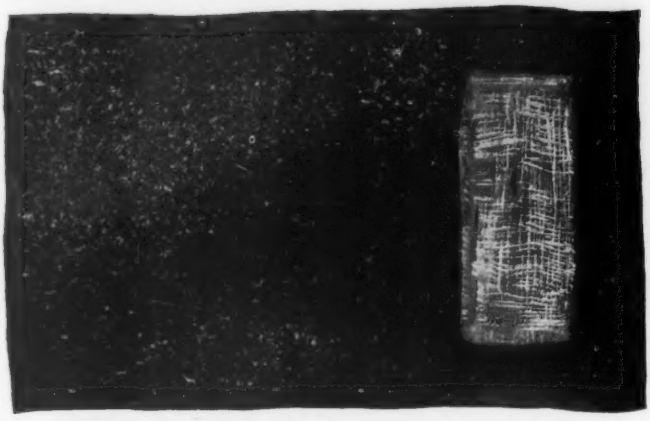


Fig. 1.

Fig. 2.

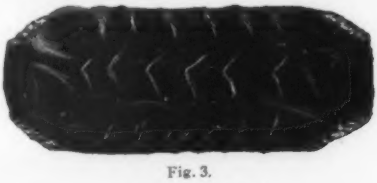


Fig. 3.

Author's Nasal Splint.

A NEW TONSILLOTOME.*

BY FRANZ C. RUPPERT, M. D., NEW YORK.

I take pleasure in presenting to you a new Tonsillotome. I am fully aware of the great variety of instruments for removing enlarged or diseased tonsils, but the fact that there are so many on the market and so different ones in use is the best proof that we have not yet found the best one. In my instrument I also have tried to contribute to an improvement of tonsillotomes. It is an instrument which, with its curve, will give more satisfactory results by its almost entire removal of the projecting mass of hypertrophied tonsil.

This tonsillotome consists of three pieces: the under and upper blades with the fork. The two blades are curved so as to form about a right angle near the cutting part, which is parallel to the handle. Through this curve is gained in the large size three-eighths of an inch or one centimeter in comparison with the ordinary

straight tonsillotome of the Matthieu or MacKenzie pattern; that is, the distance from the fork to the outer side of the cutting ring is one centimeter, so, if the round blade is introduced over the tonsil, it lies one centimeter nearer to the pharyngeal wall than the straight one. The instrument in position between the anterior and posterior faucial pillars is then pushed outwards, including the tonsil to the base. Naturally, one gets hold of almost the entire tonsil. When the knife is drawn and the tonsil amputated, the space between the pillars is pretty well cleaned out. In the smaller sizes, the distance is less.

The advantage of this curved instrument over the straight one is clear, as almost radical removal is assured. To my mind, this instrument will be of even greater value to the general practitioner who also desires to perform a successful tonsillotomy. The instrument was made for me by E. B. Meyrowitz. Especially to Mr. Goldstein of the firm am I greatly indebted for the excellent manner in which he has carried out this idea.

137 West 122d Street.

* Presented before the New York Academy of Medicine, Section on Laryngology and Rhinology, December 26, 1906.

A NEW SELF-RETAINING SEPTAL SPECULUM.

BY SAM GOLDSTEIN, A.B. M.D., NEW YORK CITY.

Resection of the nasal septum for the various deformities interfering with the normal nasal respiration and drainage, by a fairly general concensus of opinion among Rhinologists, has taken its place in the list of the requisite operative procedures that we are daily called upon to consider.

It is unnecessary at this time to review the immediate steps that have led to the adoption of the complete operation of nasal septum resection, with its various modifications dependent upon the conditions of the septum encountered in individual cases (so many reports are readily accessible in the latest literature upon the subject) as we desire only to call attention to a septal speculum that has been employed in our work for some time, and after various modifications is presented in its perfect form.

Particular attention is called to its lightness in structure, ease and simplicity of application and the comprehensive view of the operation field afforded when the instrument is in situ. After the mucous membrane on the side selected for beginning the operation is incised its muco-perichondrium thoroughly elevated, the cartilage cut, and the muco-perchondrium on the other side elevated, all adhesions on both sides removed, the speculum is placed in position. When the speculum is properly introduced into the nares through the cut muco-perichondrium and cartilage along the internal surface of the muco-perichondrium, the cartilage is fully exposed to view, and the mucous membranes are thoroughly protected against damage when Ballenger's Swivel knife, Freer's knives, or any other cutting instrument can be used in the removal of the septal cartilage; furthermore, after the requisite amount of cartilage has been removed, with the speculum in position, a complete view of the bony structures i.e., vomer, maxillary ridge, etc., is afforded, so that the operative work may be continued to its completion, and the surgeon is prepared to cleanse the parts, and pack the nares.

All of the aforementioned work can be accomplished without at any time removing the speculum, as the instrument is self-retaining, closely hugging the soft tissues, and because of its lightness of contruction, never acts as an obstacle to the work required to complete the operation.

A very important point to be considered in using the instrument (especially to one who has not had much experience in septal resection) is the almost complete immunity from the risk of tearing the mucous membranes when employing cutting instruments for the removal of cartilage and bone.

Many an operator, I believe, has for a time abandoned this almost requisite surgical procedure, after his first sad experience in tearing a rather wide swath through the mucous membrane that has afterward remained unhealed.

The speculum consists of two long, light and solid blades 6½ centimeters in length, with two side springs, 7 centimeters in length. At the upper third of the right spring and penetrating it to the left spring is a slightly curved threaded bar. A lock nut

Author's Self-Retaining Septal Speculum.

rides on the bar external to the right side spring and controls the extent to which the blades may be opened. A gauge nut is placed on the bar between the two side springs, so that the blades may be opened and the mucous membrane in the nares kept fixed and as far apart as desired by the operator.

The further apart the blades can be spread without injury to the mucous membranes (although up to date, with the blades wide spread, no accident has occurred) the greater the field for operative procedure is afforded, and the less opportunity for damage permitted.

I desire to express my appreciation in the valuable aid given by Mr. I. Goldstein of the Surgical Instrument Department of E. B. Meyrowitz, of this city.

1335 Madison Avenue.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, January 23, 1907.

T. J. HARRIS, *Chairman.*

PRESENTATION OF CASES.

Complete Removal of Thyroid Gland. By E. V. HUBBARD, M.D.

This case had been referred to Dr. Hubbard at the Hospital by Dr. Coffin. The patient was a girl, 17 years of age, who works in a bindery. Family history is negative. Paternal grandmother had a small goitre, but not sufficiently large to require operation. Was under treatment last April for a bronchial cough. The goitre was first noticed in August and increased in size rapidly until she was seen at the Hospital the last week in October. There was then present a diffuse movable swelling of the thyroid gland extending across the neck. The neck was 14½ inches in circumference. She was operated upon November 17th, a transverse incision being made. There were no large vessels, but the goitre was apparently fed with a capillary supply. Is not this often the result of this pathological condition? A pathological examination was made by Dr. Jonathan Wright, who reported that the goitre was exceedingly cystic. Apart from the anatomical features, an interesting point was for how long a period after the operation should symptoms of cachexia strumipriva be looked for. Dr. Tyson of Philadelphia says that some 16 per cent. of 408 cases showed cachexia, but does not mention the period within which it occurs. The girl is now perfectly well and has no symptoms of myxoedema. The whole gland was removed, as it was so completely degenerated that it was obviously no longer a functioning organ. Whether or not the parathyroids had taken up the work of the thyroid, he could not say, but he hoped she would not have any cachexia at all.

DISCUSSION.

DR. EINHORN said that the symptoms of myxoedema generally appear if there is no thyroid gland to perform its function. If there were to be symptoms of myxoedema or cachexia, they should appear soon after the removal of the gland, not a year or two later.

Sub-Glottic Neoplasm. Presented by DR. SIMPSON for a non-member of the Section.

Dr. Simpson said that Dr. Disbrow had kindly brought this patient for examination, as it was a rather unusual condition. He would advise those who had not seen the case to come forward and examine it, for it showed remarkably well. It was a case of sub-glottic tumor, presumably a papilloma of the vocal cord, in the anterior commissure. It shows remarkably well on both inspiration and expiration, and when thrown into the glottic space, it fills it very well. The patient is 48 years of age and has noticed the hoarseness for a year. Bearing upon the etiology, the patient had pneumonia 11 years ago. Mother died at 45 of dropsy. Father died from a fall. No specific history. The question now is whether the growth is malignant or benign. The chances are that it is benign.

DISCUSSION.

DR. HARRIS inquired whether he had understood Dr. Simpson to say that these sub-glottic tumors were rare.

DR. SIMPSON replied that he had used the term sub-glottic with reference to the location of the tumor, and that we should be careful in using the term sub-glottic. He was not sure that the origin of the growth was below the cord, but the growth itself was below, possibly because of its dependent character. The origin was very close to the anterior insertion of the right cord. The term "sub-glottic" should be used only to indicate the sub-glottic origin of a growth.

Traumatic Fistula through the Cribriform Plate of the Ethmoid Bone, By HARMON SMITH, M.D.

Dr. Harmon Smith presented an X-ray plate or photographic demonstration of a fistula through the cribriform plate of the ethmoid, with the probe in situ, the fistula being the result of an accident.

A girl aged 4 years had fallen from a third story window 18 months previous to presentation at the clinic. She had had a depressed fracture of the frontal bone over the left eye, which had been removed at the time of the accident. She had recovered from the immediate injury, but a quantity of clear fluid continued to flow from both sides of the nose, with intervals of cessation for a day or two about every month. Each cessation resulted in a convulsion, and after the convulsion the discharge would return.

The mother first consulted Dr. Haskin relative to a discharging ear, during the routine examination for which he noticed a polyp or

large piece of granulation tissue in the right nostril, and referred the case to the throat and nose department of the hospital. In the absence of Dr. Chappell, to whose clinic the case was referred, the polyp was removed by Dr. Smith. This action was immediately followed by a gush of thin fluid. A necrotic condition of the turbinate was also noticed. Upon probing to ascertain the extent of the disease, a fistula was found leading up through the cribriform plate. The probe entered the cranial cavity, and was only stopped by the curvature of the skull. A skiagraph was made with the probe in situ. In addition to showing the position of the probe, the plate also demonstrates a purulent sinusitis of the ethmoids and antrum on that side.

Before further observation could be made, the patient developed pneumonia and died. The parents refused an autopsy, and thus we can only conjecture that there had been a fracture of the cribriform plate followed by a fistula constantly leaking cerebro-spinal fluid, and that the probe entered the cranial cavity between the two frontal lobes of the brain, anterior to the corpus callosum.

DISCUSSION.

DR. FREUDENTHAL inquired whether the cerebro-spinal fluid had been examined. Some years ago he had reported a case of discharge of the cerebro spinal fluid, and it was suggested that there were perforations through the cribriform plate. The woman is still alive and has felt perfectly well for the last year or so.

DR. SMITH replied that neither microscopic nor chemical examination of the fluid had been made, but that the quantity of fluid and its point of exit were almost sufficient evidence of its being cerebro-spinal rather than mucous.

DR. THURBER said he thought that a diagnosis of perforation might be made. Some years ago a patient came to the Presbyterian Dispensary with a history of having fallen and run the rib of an umbrella in his nose, and there was a constant flow of thin watery fluid running from the nose. He would not, however, remain in the hospital for treatment. Two days later he was admitted and died of meningitis. An autopsy revealed perforation of the cribriform plate.

DR. SMITH said that he had seen several cases of cerebro-spinal rhinorrhoea, and that the quantity of fluid lost had always been excessive.

Primary Tumor of the Trachea. Extirpation. Presented by EMIL MAYER, M.D., for C. A. ELSBERG, M.D.

This little girl, now 9 years old, was brought to Dr. Mayer's service at the Mt. Sinai Hospital, in the out-patient department, with the statement that she had been suffering from dyspnoea for over a year, and the general belief was that it was a case of congenital stridor. There never had been cyanosis.

It had required a great amount of patience to examine the child; but the reward was also there, for the view of the Larynx showed a sub-glottic tumor to be present, about on a line with the fourth tracheal ring; its base was broad and no pedicle could be seen.

Endo-larnygeal operation was not to be thought of, as it was barely possible to get a view of the Larynx and instruments would not be tolerated even if the growth were higher up and more readily reached.

The attending physician then referred the child to Dr. Elsberg, at Mt. Sinai Hospital, who performed a tracheotomy, and removed a tumor which was an inch and a half long, friable, and extended from the fourth tracheal ring downwards. It had no pedicle and was broadest at its uppermost portion. The recovery was without untoward symptoms.

Subsequently the breathing became bad again and it was feared that there was a recurrence. The trachea was again opened and some granulation tissue found; no recurrence.

The pathologist's report was that it was a fibroma.

An interesting point was brought out by Dr. Elsberg in reference to anesthesia in this class of patients.

The walls of the trachea are apt to become flaccid in the narcosis and in cases of this kind it is vitally necessary to be prepared to perform a hasty tracheotomy. All preparations for operation were made, the operator and assistants were all ready before the anesthesia was begun. Asphyxia promptly supervened and rapid tracheotomy had to be performed. Without these precautions her life might have been lost.

Another point of interest is the extreme rarity of this class of tumors. In a recent paper Theisen of Albany gathered the histories of cases of tumors of the larynx in the literature of the world and found in all but 86 cases of tracheal tumors. Of the cases of fibroid tumor in young children this case was the fourth recorded.

The speaker congratulated Dr. Elsberg on the very favorable result. He also took pleasure in his own diagnosis of tumor in a young child, difficult to examine, and all in the work of a busy clinic.

DISCUSSION.

DR. SIMPSON inquired whether the voice was interfered with before the operation.

DR. MAYER replied that the voice was not affected, but that the breathing was seriously obstructed.

DR. SIMPSON rejoined that that was a diagnostic point in subglottic tumors. Unless it is so large as to obscure everything, the voice remains good.

DR. QUINLAN inquired whether a high or low tracheotomy had been performed, and also wished to know how long the tube remained in situ.

DR. MAYER responded that a low tracheotomy was performed, and that the tube remained in place not over a week or ten days.

A New Method of Operating upon Turbinal Hypertrophies, with Demonstration of Instruments, and of the Technique upon a Manikin. By SIDNEY YANKAUER, M.D. *(Published in full in* THE LARYNGOSCOPE, *page 105, Vol. XVII, No. 2.)*

DISCUSSION.

DR. EMIL MAYER felt that the Section was to be congratulated on having something entirely new presented before it. It was by no means the first time that original work had its first public notice through the Section, and hence the feeling of satisfaction that the speaker had in seeing this new work brought to public notice in this way.

When Dr. Yankauer first proposed to suture deep in the nose the speaker felt that it would either be impossible or one of the very difficult things to do. All of the cases here recorded by the reader of the paper had been seen by Dr. Mayer and referred by him for operation, and the subsequent results noted, and these were remarkable. Where formerly weeks were required for healing, a few days were all that seemed necessary.

The speaker had operated in the manner here proposed twice. The first case was a young girl with a synechia and by cutting away a portion of the mucous membrane and suturing, a free channel remained and healing was unusually rapid.

The second case was that of a physician from whom a portion of the left turbinate was removed with a snare with much bleeding then and with removal of first dressing, healing at end of six weeks.

The second operation was done on the right side. Dr. Mayer saw him twice afterward, once to remove dressing 24 hours after operation, and the second time when after some urging, the man presented himself at the end of the second week, when the wound was entirely healed. It seemed very easy to see Dr. Yankauer tie these sutures, but it required some little practice to acquire the technique. However, when this was learned, in a very short time the operation could be done as easily as say a submucous resection, which every one here feels qualified to perform. The matter of suture did not end with the operation upon the turbinate, but was particularly adapted to closing perforations of the septum, and much relief could thus be afforded to those who were otherwise doomed to much annoyance all their days. The method would become more and more useful and would doubtless be widely used, and probably some of those present might be able to make suggestions which would improve the technique and render it even more valuable. Dr. Mayer said that he was convinced that in this method we have a procedure which will prove of great service in our intranasal work.

Dr. Myles said that he could not let such a remarkable paper pass without expressing his approval. Dr. Yankauer has in this method solved many of the problems upon which light has long been wanted. For years he himself had been trying to sew the tissues on the middle and posterior parts of the septum, and had tried Rowe's needle, but with little success. He had occasionally put a stitch in the synechia, but had never been able to sew up a wound. As Dr. Yankauer presented the case, it seemed feasible in selected cases, and one that all should attempt. He had demonstrated it very clearly. In regard to one point where Dr. Yankauer said the technique was still defective—the proper instrument for the removal of the segment of tissue after making the second incision with the knife, he himself had recently constructed an automatic pair of scissors which will probably serve this purpose very well. So far he had found it as satisfactory as he could wish. There was a small lever at the end, and one could see at any time what he was cutting. They did not slide or slip, but cut just as desired. Some kind of instrument would soon be devised for cutting off the bone. Sometimes this was sawed, sometimes taken off with a punch, chisel or scissors. He wished again to express his appreciation of Dr. Yankauer's work, for it was what all had felt the need of.

Dr. Coffin said that this work showed so much sincere and honest work that he felt the Section should go out of its usual routine and express a vote of thanks to Dr. Yankauer.

Motion was made and carried.

Bronchoscopy, Esophagoscopy and Gastroscopy, with Report of Cases. By CHEVALIER JACKSON, M.D.

The paper was an exhaustive treatment of the subject, and was accompanied by a demonstration of the instruments, lantern slides, color drawings, X-ray plates, skiagraphs and specimens.

He reported five cases of foreign body in the bronchi, two removed by upper and one by lower bronchoscopy, and two not removed; all the patients recovering. He had had six cases of foreign bodies in the trachea, two removed by upper tracheoscopy, and four (that came in breathing badly), by lower tracheoscopy. Of foreign bodies in the esophagus he had seen 12, all removed but one, which required celiotomy, but which with his present perfected instruments he was certain could be removed by endoscopic methods. He had removed one foreign body from the stomach by gastroscopy. He had removed 31 foreign bodies from the larynx by direct laryngoscopy. His cases of endoscopy in diseased conditions included bronchoscopy 4, tracheoscopy 18, esophagoscopy 34, direct laryngoscopy 28.

Dr. Jackson then gave the results of his original work in gastroscopy. He referred to the attempts of Mikulicz and Rosenheim to examine the stomach, attempts which were unsuccessful practically, because of imperfect instruments, modeled after the Nitze cystoscope. He said that gastroscopy was not simply a feat but had a definite field of usefulness. Malignant disease could be discovered sufficiently early to give the surgeon a fair chance, or still better, precancerous conditions could be discovered in the curable stage. Many other pathologic conditions as inflammation, ulceration, scars, neoplasms, dilated vessels could be diagnosticated by direct inspection. Ulcers could be treated and foreign bodies removed.

He had been able to explore about two-thirds of the interior of the stomach and felt sure that the unexplorable area would soon be reduced below one-third. In one instance he had explored the entire stomach.

Dr. Jackson reported in detail 14 cases in which he had positive findings. In most of the cases the lesions were plainly seen by other physicians not accustomed to tubular work.

The positive findings were as follows, some of the patients having more than one condition:

Chronic gastritis	2 cases
Gastroptosis	2 cases
Malignant, cardia	2 cases
Malignant, pyloris	3 cases
(Specimen taken in two instances)	
Peptic ulcer	5 cases
Peptic ulcer cured (?)	1 case
Negative results of value	1 case
Foreign body removed	1 case
Gastric syphilis	1 case

In no case had any harm resulted, and with careful attention to details of technic, he thought the only dangers were those of ether anesthesia.

DISCUSSION.

DR. WYETH regretted that unavoidable delay prevented him from hearing all of the paper of the evening, which would prevent him from discussing it intelligently, and that owing to the lateness of the hour, there was really not time to give such a satisfactory and useful demonstration the attention it deserved. The lower oesophagus was the "via dolorosa" of the surgeon, and anything which would throw light upon the mediastinal portions of this tube must rank as a valuable contribution to practical surgery.

DR. BOYCE: It might be well to say a few words on the gastroscope as a practical clinical instrument. There are a number of theoretical objections which suggest themselves to anyone. In the first place, from the ill success which has attended former effort at gastroscopy it might be supposed that the passage of the instrument would prove too difficult for anyone but a laryngologist. In the occasional case that justified its use therefore, we should have the tube passed by a man entirely ignorant of stomach troubles, and therefore unable to balance the history of the case against the picture he sees in the tube. With him, we should have a man who has seldom viewed the gastric mucous membrane in the living, and who is possibly unable to focus his eye through an 80 c. m. tube. When so passed, the proceeding seems dangerous. In cases of gastric ulcer, we pass the soft rubber stomach tube gingerly and with hesitation barely through the cardiac oriface. It would therefore seem inadmissible to ram a small sized shotgun into our patient's abdomen, as though we were gunning for internal piles, unless we could positively exclude gastric ulcers.

Now we never can positively exclude gastric ulcer, for nearly a quarter of all cases are absolutely latent as regards symptoms. In the third place it might be thought that the inspection would be seldom called for. Gastrologists are already the envy of all other varieties of clinicians for the certainty and precision of their diagnosis. In the fourth place, the examination can never be complete and satisfactory, for certain areas of the stomach cannot be viewed through this tube. When you have done your best (or your worst) with the gastroscope, and have seen only the pale relaxed membrane of neurasthenia or the congestion and thickening of alcoholic gastritis, you can not be certain that there was not an ulcer or a cancer along the greater curvature.

All these objections seemed to me at one time perfectly sound. If I had been the original man from Missouri I could not have attended my first gastroscopy in a less sympathetic attitude. Of them all, one and one only, has survived actual knowledge of the instrument. There is an area that cannot be brought opposite the end of a gastroscope of the Jackson pattern. This area is smaller than you would suppose if you are still bound by text book pictures of the shape and position of the stomach in cadavers that have hardened in the horizontal position. It will grow smaller with wider practice in external manipulations. But it still remains, and Dr. Jackson must admit it as one of the limitations of his method. That it only limits and does not destroy its usefulness is shown by the fact that the same consideration, "Negative findings are not decisive," applies to nearly all of our diagnostic technique. It applies to the Widal test, to the sputum stain; to that very useful measure, the lumbar puncture; it applies to the physical examination of the chest of infancy and to the ophthalmoscope in brain disease. Yet we do not excuse the clinician who deliberately remains ignorant of any of these measures. No other objection stands the actual trial. The difficulties are considerable but their field ends at the cricoid cartilage. It is not harder to pass a straight rigid tube into the stomach than to the mid-oesophagus. In the presence of Dr. Einhorn I do not feel called on to argue that the difficulties outweigh the advantages. As to the danger, we must not overlook the fact that once the cricoid is passed the obdurator is removed, the light turned on and every subsequent step is in plain sight. If there be dangers they lie not in the operation but in the operator. The instrument itself is scarcely more dangerous than the soft rubber tube passed in the dark; not so dangerous as the oesophageal bougie, infinitely less dangerous than the gyromele.

As to the sufficiency of present methods in gastric diagnosis, it is only from the relative viewpoint that gastrologists can plume themselves; absolutely their knowledge is still very imperfect. As scientists they can as little as any of us afford to neglect any additions to their armamentarium. They can distinguish with wonderful precision between one organic lesion and another. But to distinguish purely functional lesions from organic they must rely on these so-called intuitions, which, however accurate they may be in the hands of the men of large experience, however useful to us as practitioners, belong yet to the art rather than the science of medicine. Already Dr. Einhorn looks within the cardia. Tomorrow he will lengthen his tube and work step by step down to the very bottom of the greater curvature, gaining enthusiasm at every step. Ten years from now the stomach specialist will be as unwilling to do without the scope as the laryngologist would be to dispense with the throat mirror. Perhaps by the time I next have opportunity of addressing the New York Academy of Medicine I shall admonish it with trembling forefinger and in the quavering voice of age remark that the gastroscope isn't everything; that it does not replace brains or care or experience; that a self-sufficient generation relying on it exclusively has lost that wonderful clinical insight and that success in treatment that distinguished Hayes and Einhorn and the other giants that existed in my day.

Dr. Elsberg said that he had had no experience at all in this kind of work and could only speak as an admirer of the work that had been done by Dr. Jackson. He did not think, however, that full success could be expected in gastroscopic work until the entire stomach could be examined, as the bladder can now be examined by the cystoscope. Cases where we have negative findings are just the ones where the gastroscope is really needed. He had had some experience with the oesophagoscope, and had first seen this work in Breslau about eleven or twelve years ago. Since that time, he had used the oesophagoscope frequently, and did not find the introduction of the instrument difficult if proper care was taken, and no force used, as Dr. Jackson had said of all instruments, whether introduced into the trachea, oesophagus, or stomach. Unless the instrument is pointed in the wrong direction, the tendency is to enter easily. If you have the patient in the right position and pass the finger into the mouth, whether anaesthetized or cocainized, and pull forward the epiglottis and base of the tongue, there is very little trouble. He agreed with Dr. Jackson that the correct manner of examining the

oesophagus is with the eye, passing the instrument gently downward and watching carefully. In this way he had been able to recognize neoplasms and cardiaspasm, and had removed quite a number of foreign bodies from the oesophagus—pins, etc.

When Killian first described the bronchoscope, the subject was brought to his attention by Dr. Yankauer and Dr. Mayer and he had been much interested in this branch of work. Surgeons had in the past occasionally examined the trachea and bronchi through a tube passed through a tracheotomy wound, so that the idea was not entirely new; but in the majority of cases in an attempt to extract a foreign body they made a tracheotomy wound and fished in the dark with forceps to try and capture the foreign body, sometimes succeeding and sometimes failing, but always causing more or less trauma of the mucous membrane. During the past year he had had three cases of foreign body in the bronchi—two in the right bronchus and one in the left—which had been successfully removed. One was a turkey bone which had been in the right bronchus for six months.

Dr. Einhorn said that all present must feel very grateful to Dr. Jackson for his very careful and fine illustration of the subject and for the demonstration of the instruments. In regard to the gastroscope, he had only a few words to say. He had never had occasion to extract foreign bodies from the oesophagus, but had had occasion to inspect malignant growths in that region and had usually made the diagnosis of malignant tumor, and had seen pictures similar to those shown by Dr. Jackson. He had also had two cases in which the symptoms pointed to some severe lesion, the patients not being able to eat and losing from 40 to 50 pounds in weight. Upon examination with the bougie, he had not been able to discover the trouble, but with the oesophagoscope erosions were found at different spots and it was inferred that it must have been a contraction or something of the sort which caused them to avoid eating, and these patients were entirely cured in a short time, on account of the knowledge gained with the instrument. He usually introduces the instrument with the patient in a sitting posture, and ordinarily without anaesthesia of any kind. He had also had the idea of constructing a longer instrument with which to look into the stomach without the aid of anaesthesia, but found that this was very disagreeable to the patient. He was convinced, however, that with anaesthesia the gastroscope can be introduced very easily, and he had found it a very useful instrument. He could not say that he felt we know as much about the stomach as Dr. Boyce had suggested, for there is much in-

formation yet to be acquired. He often felt in doubt as to whether there was beginning malignancy. He might think a case was malignant, but could not be positive. It would be a great gain if one could inspect the entire stomach. Dr. Jackson's instrument had the disadvantage that only a small portion can be inspected at one time—the area which is opposite the opening, while with the others a larger area can be seen. About 17 years ago he had tried to introduce Mikulicz's instrument and succeeded, but the patient had some difficulty in swallowing for two or three days. If, however, patients are examined under anaesthesia, they will not suffer so much afterward. He certainly intended to try Dr. Jackson's instrument as soon as it was feasible to do so.

DR. HAYES said he also felt deeply indebted to Dr. Jackson for the paper. The main point for consideration is the danger of using the gastroscope in the stomach. The only times when it is particularly needed are in cases of ulcer and malignant disease, and in these cases the lesion is most apt to be found in the region of pylorus or lesser curvature. In such cases the dragging or pulling on the stomach to bring the pylorus into the field of vision involves great risk, and consequently this direct view is hardly available where it is most desirable. If Dr Jackson could so modify the instrument as to secure a good view of the pylorus and lesser curvature without this forcible manipulation, it would be a great step in advance.

DR. HUBER said that he had been particularly interested in Dr. Jackson's case of enlarged Thymus, in view of the experience of some of our German colleagues. Ranke and several others in some very severe cases due to large thymus glands have cut down and brought the gland forward and have relaxed the pressure without the necessity of tracheotomy and subsequent enucleation. There is a small heart, small vessels, and a large number of enlarged glands—all essentials in the condition to which the term status lymphaticus has been applied, and if a much less serious operation will serve the purpose it must be better than the more serious method. He had also been much interested in the subject of foreign bodies from the standpoint of the general practitioner who has often been called upon to make a diagnosis of abscess of the lung or gangrene months after a foreign body has been inspired, and where there was no history of such an etiological factor. He told of two cases in which after eliminating every other possible cause, such as bone trouble, septic processes, etc., he was forced to the conclusion that there must be a foreign body. Examination with the X-ray proved this to be the case,

and the child, 2½ years of age, was put under chloroform and a low tracheotomy was performed. In this case there was a large thymus, which was anchored anteriorly and so kept out of the way while the trachea was incised. Then with the help of an ordinary Gill Wylie uterine packer, the suggestion of Dr. H. M. Silver, as a bronchoscope, and a very delicate lamp used in urethral work, he was able to see a black speck low down on the right bronchus. This was seized and proved to be a nail two inches long, which was easily removed. This had given rise to a large abscess involving the upper and middle lobe of the right lung, and had been in situ for 8 months. The child recovered very nicely. The tube remained in for a few days, but there is still a large abscess which is contracting. He had an X-ray plate showing the nail embedded in the lung.

An Additional Turbinated Bone Situated below the Lower Turbinated. ERNST URBANTSCHITSCH. *Monatschr. f. Ohrenh.*, Berlin, October, 1904.

The author found a structure resembling the turbinated bones, situated below the lower turbinate. It consisted of a shelf of bone covered by mucous membrane containing erectile tissue. The structure was present on both sides. It was found in two cases, mother and son, and the author considers it a congenital malformation, resulting from an anomalous development of the intermaxillary bone.

YANKAUER.